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WIRELESS MICS, YAESU VR-120 REVIEW

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Vol. 20, No. 7

July 2001



On our Cover

2001 Fire Season

Scanning

By Jon Van Allen

There is always a fire season: the only question is, how bad will it be? During drought conditions, fires may not even wait for a season, but may spring up anytime, as they already have in Florida this year.

During last year's devastating fires in several western states, the author realized his frequency information was outdated. The National Interagency Fire Center had made several changes to improve communication between agencies. Jon shares his discoveries and experiences as he and his wife monitor firefighting efforts near their camp in Yellowstone National Park. (Story starts on page 10.)

Cover photos: Charred wood from a fire near Grant Village, Yellowstone National Park; photographer Karen Van Allen. Inset: Elk in the Bitterroot River, courtesy of Alaskan Type I Incident Management Team; photographer John McColgan, Bureau of Land Management, Alaska Fire Service.

A Monitor's Guide to Maps 12

By Bob Felton

You may be listening to pilots preparing to land or reporting waypoints on a long-distance flight; you may be following police chasing a suspect or reporting a traffic pile-up; you may be listening to search and rescue efforts to reach stranded hikers in a wilderness area; you may be tuning in to a remote broadcast from Zimbabwe . . . Whatever it may be, when you locate what you are hearing by seeing it on a map, you have introduced a new dimension into your listening.

Broadcasting in Zimbabwe 14

By Colin Miller

This ancient, landlocked African country has a sporadic history in radio. Shortwave broadcasting resumed in 1994 after a few years off the air, but only one of two transmitters appears to be active. This is a rare catch that would be a real gem in any DXer's log.

KJES 17

By Hans Johnson

Have you actually listened to KJES? This religious broadcaster has gotten a bad rap in the DX press, says Johnson, and it deserves a second look. You might be surprised.

A "folded" Folded Dipole 18

By Richard Q. Marris G2BZQ

Marris adapts this classic, simple antenna design for use as a portable or indoor VHF/FM antenna with directional qualities. Using simple twin feedline for construction, it's both easy and inexpensive.

Listening to the Grand Old Game 20

By Ken Reitz

Every Major League baseball team has its flagship radio station and a network of affiliate stations so its fans can hear out of town games. For those outside the reach of local broadcasts, the games have been available via internet audio, but MLB is now charging a seasonal fee for this audio feed. Check this article and the *Monitoring Times* website for the 2001 roster of ever-changing flagship and affiliate stations.

Memories from Baseball Broadcasts 21

By Harold Driscoll

Back in the '50s, when a team had an out of town game, the radio broadcast of the game may have sounded like live action reporting – and it was, sort of. Except the announcer was getting the play-by-play via teletype. It was Harold Driscoll's job as technical director to make it *sound* live. And thereby hangs a tale...



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Reviews:

The *Yaesu VR-120* is a tiny, wide-coverage scanner so similar in features, size, and price to the Icom IC-R2 that Bob Parnass does a head-to-head comparison between the two. One surprise is to find the VR-120's stock antenna excels at shortwave reception. See the review on page 84.

Jock Elliott is so taken with the *Icom IC-706MkIIg* amateur radio receiver, that he is making a case for new hams to consider jumping straight to an all-in-one transceiver when they get their license, instead of gradually accumulating an arsenal

of equipment for each meter band. He covers basic features in the first of this two-part review on page 88.

What is an internet "receiver" and is it really a radio? John Catalano reviews the *iRhythm* internet tuner and tries to answer this question (page 80).

Long-time subscribers will especially appreciate our index of all *Monitoring Times* reviews published between 1994 and the current issue. Not all reviews are available as reprints, but if you have the collection at home, this index will help you find what we reviewed and when (p.86).

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Sealand to Operate Internet Websites

The music and movie entertainment industry wants ISPs (Internet Service Providers) to be responsible for the file-sharing piracy actions of their subscribers. But new stealth platforms are emerging that make it impossible for ISPs to detect copyrighted file-sharing. These systems "hide" online data collection and transfer by scrambling information making it impossible for ISPs to police the activities of their users.

By far the most exotic of these operations is **HavenCo.com** which is locating its servers to the sovereign Royal Principality of Sealand. Sealand is a man-made island fortress in the North Sea off the coast of Great Britain, France and Germany. It is constructed of two hollow concrete cylinders and a steel platform very similar to a large sea-based oil-drilling platform.

Unbelievably, the 450 feet by 125 feet platform nation claims to be an independent country. See a photo at: <http://www.fruitsofthesea.demon.co.uk/sealand/gallery.html>. The Sealand government has their website at: <http://www.sealandgov.com/>. There is also another Sealand website at: <http://www.principalitysealand.net/> which is said to be a fake.

The history of Sealand

The entire history of Sealand is steeped in controversy and "cloudy" information. During World War II, the United Kingdom established a number of offshore military bases to defend England against German air raids. These sea forts housed enough troops to man and maintain artillery designed to shoot down approaching German aircraft and missiles.

One of these concrete and steel fortresses, called "Roughs Tower," was located about seven sea miles from the English coast in the international waters of the North Sea ...more than double the then-claimed three-mile range of territorial waters. It was occupied by 200 British servicemen. After the war ended, the troops were withdrawn and the fortresses torn down – all except Fort Roughs Tower.

From a legal point of view, (so the story goes) the deserted and abandoned island platform constituted extra-national territory. This paved the way for occupation. On September 2, 1967, Paddy Roy Bates, a former English major, settled there with his family. One version has it that he seized Roughs Tower from the operators of Radio Caroline, a pirate broadcast station.

With skillful legal help, Roy Bates had the man-made island declared a conquered territory and his own private state. He bestowed the title of Prince Roy of Sealand upon himself ...his wife became Princess Joan. In 1968, the independence of

Sealand was upheld in a British court decision where the judge held that Roughs Tower stood in international waters and did not fall under the legal jurisdiction of the United Kingdom. The Royal family and other loyal persons have occupied Sealand ever since ...for more than 30 years!

In 1975 the Sealand national Constitution was developed ...followed by the flag of the Principality of Sealand, a national anthem, and stamps. Gold and silver coins bearing Princess Joan's head (tied to the U.S. Dollar) were launched as Sealand Dollars. At one point, Prince Roy tried to license a Florida group and others, to start radio and television broadcasting from Roughs Tower.

Island "nation" leased to computer firm

In 1999, with the health of the Royal family failing, the founders of HavenCo began negotiations to take over control of the "country" as the location of its secure servers and datacenter operations. Last year, a deal was finalized between the Royal Family and HavenCo to exclusively lease all the physical territory of Sealand. HavenCo, Ltd., which is registered in the Caribbean nation of Anguilla, will be linked with the outside world using satellite links.

Haven Co. is as its name implies – a tax haven where (according to their website at <http://www.havenco.com/>) "...the customers' data will also be physically secure against any legal ac-

tion." They offer "Advanced cryptographic protocols to support access control, financial transactions, and secure transaction backup."

Their management team has a background in Internet sports betting, tribal gaming and Caribbean casino operation. MIT-trained Ryan Lackey, an expert in cryptographic electronic cash handling, is their Chief Technical Officer. HavenCo's Chief Logistics Officer is "Michael of Sealand." Michael, now 49, is the son of the reigning Prince Roy of Sealand whose age now approaches 80.

Michael has "...spent several years renovating and manning the Sealand fortress as well as arranging for all security and logistics. Michael has a good knowledge of firearms and is highly trained in combat shooting and small arms." That little bit of website information apparently means that the Principality of Sealand will be defended.

Sealand, which says it has de facto recognition by some governments, is attempting to obtain a greater level of world recognition. It wants to have more of a real world nation status rather than a strange legal curiosity. There has even been talk about "annexing" more land next to the island and setting up a casino.

In October 2000, the Radio Amateur Association of the Principality of Sealand was formed. Its headquarter's club ham radio station is 1SL1A. RAAPS' charter says it will represent Sealand in international amateur radio affairs, will attempt to obtain IARU and ITU membership and have Sealand added to the ARRL-DXCC list. It was supposed to have been on the air from last December 9 to 12, 2000. But the operation was postponed, possibly because of the HavenCo, Ltd., deal. Theoretically, Sealand set aside 1SL2 prefixed call signs for reciprocal operation. Check out its website at: <http://www.1sl.org>.

It is no longer possible to develop a man-made country in the middle of the sea. A United Nations conference on the Laws of the Sea held in Montego Bay December 1982 agreed that a neighboring country is required to consent to the construction of any artificial island. Furthermore, the island must be dismantled and removed immediately after its intended use.

This is admittedly an unbelievable story ...one that we have been following for some time. We will just have to wait and see what happens. It is getting difficult to separate fact from fiction!

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2.4.2000

Night Stand Monitoring Station

"My name is Dennis Parker from Kansas City, Missouri. Attached is a photograph of my unique monitoring post. It is all next to my bed. I can listen to anything anytime of the night and day with my earphones and not disturb anyone. With my four channel mixer I can listen to four different sources at once. It allows me to monitor my local fire, police, and ambulance frequency while listening to my favorite AM talk show or FM music. I am kept current on all activities within the city as I lay in the comfort of my own bed."

"Behind the scene, however, is a mess of wires. Under the bed is a series of power strips to provide power to my series of 12 AC adapters that run everything in the picture."

"Needless to say my wife is not pleased with my scanner hobby. She is embarrassed for anyone to see this brilliant set-up in the corner of our bed room."

— Dennis Parker



Fan Mail and More

"I have been into the scanning hobby for years. I became a ham (KB1EYR), just before restructuring and I got into shortwave listening prior to that. Recently I became interested in AM DXing. Two years ago I was "turned on" to *Monitoring Times* by John Sheldon of Sheldon's Furniture store in South Kingston, Rhode Island. I heard scanners behind the store's counter and we hit it off pretty well. I went across the street to Heeley's magazine stand and bought an issue of *MT*. My life has been much better for doing so, as I subscribed that week while on vacation."

"The magazine and staff writers are of the highest quality. I have never enjoyed a magazine so much as *MT*. When an issue arrives in the mail it brings joy. Please keep it going. Your web site is enjoyable also."

Raymond Chevalier (KB1EYR), East Hartford, CT

"My name is Hector E. Perez NP4FW a subscriber for *Monitoring Times*, a real great publication. This is a magazine I read from page to page. "Scout's Honor," I enjoy *MT* more than my *QST*. Radio for me is a very wide world. I have always said that as long as a person enters and enjoys the hobby, the horizon is wide and everybody fits in well. In terms of listening, SWL, BC I like it all. I am an avid SW Listener; however, I love to hear it all."

"I wonder if some day *Monitoring Times* could do a good article on radio at Puerto Rico?"

(With very little arm-twisting, Mr. Perez agreed to try writing the story himself. It was obvious he already knew more about the subject than those of us on the mainland. We look forward to this story on PR's past and present in radio - rb)

Websites to Recommend

"My name is James Rokitka, I have a subscription to *MT*. I have a BC245XLT scanner and I found a website for tricks and hints for that scanner, the website is http://www.iconstl.net/~toddh/245xlt_tricks&hints.htm"

Marine DSC

"Apropos of the April *Communications* item on Digital Selective Calling Marine VHF registration, only new fixed Marine VHF radio designs need to be DSC-capable. Portable handheld marine VHF transceivers of new design are not covered by the FCC DSC requirement. Be warned, too, that if the user fails to enter the lengthy MMSI number correctly in the transceiver memory, the system will lock up, necessitating a factory repair sta-



tion reset. Some units allow only two chances to get it right by the user."

"Some new DSC rigs are the Raytheon RAY53DSC, Standard Horizon Intrepid/Intrepid LE, Standard Horizon Spectrum, Icom M502, SIMRAD RD68 GMDSS and Sea 157VHF. The Icom M-127 VHF has had a DSC board option for a number of years. Several of these rigs also have scrambler extra-cost options. Finally, the Icom M402 is pending FCC approval (may be now granted)."

"I taught basic electronics in 1955-1957 in the Navy TAR (Training & Administration of Reserves) program. Now I teach marine electronics as a Ventura Power Squadron Senior Member, in my retirement years. *MT* is a superb class act!"

Doug Robertson, Oxnard, CA

Thanks, Doug – You're one of the reasons *MT* is so good, since you're one of the most prolific contributors to our Communications column. M/V Seeker is appropriately named for one who remains so active and interested in his retirement! - rb
Coincidence?

"As most of us know, The Counting Station (Spanish Version V5) has remained on a predictable schedule for a few years now, using three sets of frequencies, for a total of six broadcasts a week."

"I revealed this schedule in the article I wrote for the March issue of *Monitoring Times*. As soon as the issue hit the streets; ALL six TCS/V5 transmissions went SK."

"A coincidence or ?"

John Maky

"I've got one just as good, John. I wrote an *MT* exclusive feature in the October 1994 issue titled 'Drugs, Spies and Numbers' which exposed the origin and purpose of the Spanish 4-digit number stations widely heard at the time. These broadcasts were part of the US counter narcotics operations in Latin America and the whole operation was transmitted out of Warrenton, Virginia. After that article hit the street and within a short span of time, I never again received another 4-d SS numbers intercept for the Ute World log section in *MT* and to this day haven't any 4-d SS intercepts in any publication."

"Remember the ad that ran once in *MT*? "
"The CIA subscribes to MT, shouldn't you?"

Larry Van Horn, N5FPW

Generator X

"Was glancing through the pages of the May *Monitoring Times* and saw Haskell Moore's great story about generators. I just wanted to let you know of a company who started manufacturing 5kW & soon to be 10kW units for pick-ups, and other utility vehicles. They had a lot of press recently about selling several hundred units to the government and other state agencies. I thought you might be interested in this unit since it puts out 'clean ac' power for the ham/scanner communities.

"Take a look at their web site: <http://www.aurasystems.com/>"

Jay Rosenberg

"There is a serious omission in Mr. Moore's otherwise excellent article on generators in the May issue. The omission is the voltage output/regulation of the generator. The less expensive (none are really cheap) generators in the 4000 to 5000 watt category often are terrible in this area with outputs of almost 140 volts (I know; I have one like this). With today's households having lots of sensitive solid state items (TV's, Microwaves, VCR's, other computer controlled appliances, and of course personal computers) these high voltages can cause expensive damage. Therefore, be sure you check out this area before you buy or you could be very sorry."

John Frank K3IC

"Not including information about voltage output/regulation was a decision I had to make for several reasons. First, was space limitations. Secondly, to properly address this issue would have opened up a can of worms that I wasn't prepared to address. For example, if you state that one generator is better than the other, which one is best? And if you start naming names, you'd better have done extensive testing to back up your claims. Then you have to qualify the criteria for the test to ensure objectivity.

"As you can see, this gets into a lot of detail, time and expense. I even considered addressing the issue in a few broad sentences, but didn't feel I could do it justice, and would probably just cause more confusion in the end.

"You are certainly right in your claims that voltage output varies significantly from one generator to the next. I've heard horror stories. Probably the best models for powering electronics (if you can trust the manufacturer's claims) is the Honda EU series. The EU1000i, EU3000i, and the newly introduced EU2000, use a circuit that converts DC (12 volts, I think) to 120 VAC with a computer-controlled inverter. It then varies the throttle in a linear manner depending upon the load, as opposed to having to run full throttle all the time.

"They are pretty pricey, with the new 2,000 watt model running about \$850. Also of interest is that two of these units can be connected with a proprietary cable which will then double the output wattage. It is also interesting to note that they are so well insulated that even when run-

ning at full throttle, they are barely louder than a conversational-level voice."

Haskell Moore, W5HLM

An Invitation to Participate

Letters and News:

We thank you for buying and reading *Monitoring Times*, and many of you have written to tell us how much enjoyment that brings you. Several others go the next step and clip out stories from local papers relating to radio to keep our columnists up to speed. Others send in letters to the editor or columnists with tips, information, corrections, and opinions. All this makes *MT* what it is – a wide-ranging community of radio lovers.

Features:

Do you find yourself frequently showing friends how to program their radios? How to decode digital modes? What the word propagation really means? How to understand what the EMS personnel or commercial pilots are saying? How to decide which radio to buy?

Then you have a gift for passing along what you know, and it's time for you to take the plunge and share your knowledge with a lot more people as an *MT* feature writer. We always need "how-to" articles over the entire range of *MT*'s coverage, from LF to satellites.

If you're not too good at prose but you keep excellent records, then consider a frequency profile of your local public safety system, a tutorial on how to organize shortwave loggings or QSL reports, or a quick bandscan of what can be heard from your location. Listeners have especially requested advice on shortwave reception from the West Coast.

Reviews:

Reviews are always popular with readers. *Monitoring Times* accepts free-lance reviews of accessories and shortwave receivers. These may be new or older equipment which is widely available, and may be brief or in-depth reviews.

In the case of reviews and features, contact the editor about your idea before proceeding. For more details about writing for *MT*, consult our guidelines at www.grove-ent.com/mtwritgd.html or send a self-addressed, stamped envelope to receive the Writer's Guidelines by mail.

Rachel Baughn, Editor
mtditor@grove-ent.com
P.O. Box 98, Brasstown, NC 28902

DAYTON HAMVENTION Happy 50th Anniversary

Bob Grove W8JHD

It was rather prophetic that Dayton's legend hamfest should celebrate its 50th anniversary this year; it's also my 50th anniversary in ham radio! I started out with a Novice Class license back in 1951, obediently tapping out Morse code with my surplus J38 key. At that time, vacuum tube equipment reigned supreme, with WWII surplus gear still available by the ton. The transistor was still a curiosity among those who could afford it.

As ham radio grew, so did the Dayton Hamvention. At its peak, claims were made as high as 35,000 in attendance over the three-day affair. Even torrents of rain couldn't keep eager enthusiasts out of the 14 acre flea market, I among them.

But, the advent of the Internet, CB, incentive licensing, and other factors signaled a slow reduction in the ham ranks. The average age of remaining hams climbs as their numbers fall, and few youngsters clamor to join the fraternity. A look through Dayton now is a visit to the future as much as a mirror to the past. Young visitors pore over the computer equipment, while we dinosaurs gently fondle the classic ham gear: Johnson, Heathkit, Globe, Gonset, Hammarlund, Hallicrafters, National....

In all fairness, modern solid-state gear kicks the pants of old vacuum-tube stuff, but I still love to see the filament light in a 6L6G! Equipment is smaller and lighter, too, and the bang for the buck is considerable. DSP, frequency synthesis, memory storage, and so many more features were undreamed of among the manufacturers when I cut my teeth on ham radio.

One thing hasn't changed: The warmth of friendship, the renewing of old acquaintances, and the anticipation of new products and bargain prices still echo through the exhibit halls.

The attendance may be down, and dealers may be at each other's throats with predatory pricing practices, but Dayton is a spectacle. Many consider it a mecca – a shrine to ham radio. I consider it just plain fun.

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to *Letters to the Editor*, PO Box 98, Brasstown, NC 28902, or email mtditor@grove-ent.com. Happy monitoring!

-Rachel Baughn, KE4OPD, editor

COMMUNICATIONS

BBC: International Outcry Expected

The BBC has announced plans to discontinue shortwave broadcasting to North America and Australia at the end of June. In an *LA Times* article by David Colker, Jerry Timmins, head of the Americas region for the BBC World Service, said "What we are not doing is saying shortwave is dead. The vast majority of our listeners still access us on shortwave. But a shift is happening, no question about it."

On-air announcements of the BBC shortwave cutbacks are scheduled to begin this month, Timmins said, and they are not likely to be received kindly by stalwart listeners. "The World Service generates enormous loyalty," Timmins said.

Voice of America director Sanford Ungar expects a similar trend to continue within the VOA. He says he feels no nostalgia in the face of its probable passing.

"I think that if the signal is clearer and easier to tune in, that's progress, whether it's on a radio station or a Web site," he said. "Maybe there are some people who think it's romantic to have trouble hearing the radio, but not me."

See page 41 and *Closing Comments* for more on this story.

Playa de Pals Transmitting Station Closed

On May 25, the US International Broadcasting Bureau closed its shortwave transmitting station at Playa de Pals, Spain. The site was originally owned by Radio Liberty and was used for RFE/RL and VOA transmissions to the former Soviet Union.

The US Government, through its Broadcasting Board of Governors, has monitored changing political conditions and re-examined its shortwave broadcasting requirements for Russia and Central Asia. In its opinion, the availability of new media and other transmitting locations to reach the former Soviet Union, along with the development of democratic institutions

and market-based economies in the region, created a situation in which its broadcast operations could no longer be operationally or financially justified. (*Communications World*, Voice of America)

Bob Padula of EDXP speculated that the facility could be taken over by the Spanish authorities for its own external services, as there is a lot of high-powered transmitting capacity there (six 250 kW). Visit <http://www.members.tripod.com/~bpadula/edxp.html> for a description, with photos, of a visit to the station in October 2000.

Radio Canada International to Cut Back

Despite a surplus from last year's budget, and an accord signed by the Ministry of Canadian Heritage, guaranteeing the service would continue at its present level of operations, RCI and CBC management have decided to make cuts to RCI operations. It appears the service has been spending above the \$15.52 million allotted for RCI operations, so a shortfall is being anticipated next year. In consultation with RCI staff, the following action plan has been adopted:

To continue daily broadcasts in seven languages. Production activities scheduled only during the week; no live newscasts on the weekend. All programs will be half hour long. Two English and French daily programs from Monday to Friday. Weekly English and French theme programs for target audiences on weekends: Canada in the world, International Trade and Technology, Meet the Press, Arts and Culture, Mailbag and chat.

Public Interest Wins over Privacy

The U.S. Supreme Court has ruled (in *Bartnicki v. Vopper*, *Communications* Feb 2001) that the news media may not be held liable for disclosing the contents of telephone calls that have been illegally intercepted and recorded by someone else, at least not in matters of public importance.

Justice John Paul Stevens said the privacy of communications was of strong government interest, but did not outweigh the interest in publishing matters of public importance. When a publisher has lawfully obtained information from a source who has obtained it unlawfully, the government may not punish the ensuing publication.

The ruling was a setback for the U.S. Justice Department, which had defended the law aimed at protecting the privacy of telephone and other electronic conversations.

FCC Rules on Appeal

The FCC has responded to a petition by Tandy and Uniden to modify some of the rules designed to enforce cellular privacy. The FCC

denied the request to exempt scanning receivers for the 30-512 MHz range from the circuitry inaccessibility requirement and the warning label requirement imposed to prevent reception of cellular signals.

The FCC did grant that, in those cases where the receiver is too small to affix the required permanent warning label, the information could instead be printed prominently on the outside box and in the instruction manual.

The petition had requested a change in the wording on the warning label, but since related legislation then pending was not acted upon by Congress, the FCC said there was no reason to change the wording.

The FCC did agree to a change in the definition of a scanning receiver to exclude receivers which scan weather channels, Part 73 devices, or which are part of a licensed service. It also clarified the level of cellular radiotelephone

BULLETIN BOARD

July 4: Harrisburg, PA

Harrisburg RAC 29th Firecracker Hamfest at Emerick Cibot Park, Bressler (Harrisburg Area); Talk-In: 146.16/76, adm \$5 (\$10 carload). Free VE exams given at 9 AM in the Oberlin Fire House. Camping: PA State fireworks on riverfront. Info: w3uu@aol.com or <http://members.aol.com/w3uu/>

July 7: Oak Creek, WI

South Milwaukee ARC 33rd annual Swapfest, American Legion Post #434; 9327 S Shepard Ave; Oak Creek, WI, 6a.m.-8p.m. CDT, Talk-in 146.52 Simplex; adm \$5. Picnic area, camping. Hot and cold beverages, prizes. SMARC, P. O. Box 222, South Milwaukee, WI. 53172-0102

July 15: Kimberton, PA

Mid-Atlantic ARC 23rd Annual Valley Forge Hamfest and Computer Fair, Fire Co. Fairground (Rte 113 - S of intersection w/ Rte 23), Talk-in 146.835/-, 443.800/+ CTCSS 131.8; Adm \$6, 8 a.m. Dealers, flea market, Amateur Radio Bus Museum, Food vendors, door prizes. Information: Bill Owen - W3KRB 610-325-3995, E-mail: gem@op.net or visit <http://www.marc-radio.org/hamfest.html>

July 27-29: Boise, ID

WTFDA (Worldwide TV/FM DX Assoc) Convention, Super 8 Lodge, 2773 Elder St, Boise ID 83705. Host Frank Aden (4096 Marcia Pl, Boise ID 82704 - N7SOK@aol.com). For reservations (208) 344-8871 (mention Frank Aden). Rates \$62.10 (for a double). Registration \$20.

July 28: Cincinnati, OH

OH-KY-IN ARS 4th Annual Hamfest, Diamond Oaks Career Development Campus, 6375 Harrison Ave, east of I-275 and I-74. Adm \$6 (space free w/admission); talk-in 146.670(-) and 146.925(-). Seminars, hunts, vendors, VE exams (8am, walk-ins accepted). For more info Lynn Ernst, WD8JAW, 10650 Aspen Place, Union, KY 41091-7665; 859-657-6161; wd8jaw@arrl.net or <http://www.qsl.net/k8sch>.



Bob Padula at the controls of PALS. Photo courtesy of Bob Padula

COMMUNICATIONS

signal which must be rejected in order for a scanner to meet FCC specifications.

If You Can't Beat 'em, Join 'em

In the north suburbs of Detroit, Michigan, communications problems just got solved by a little cooperation. Communications from the town of Madison Heights were often overwhelmed by those of its larger neighbor, Royal Oak, because both repeater systems output on 155.010 MHz. Royal Oak's repeaters broadcast at 100 watts. If Madison Heights were to apply for its own 100 W tower, it would require approval from both the FCC and Canada, which could take up to two years to get.

The solution? Madison Heights will share Royal Oaks' six repeaters and will add their two repeaters into the system. The agreement is a temporary, yearly renewable contract, as both communities are waiting for an 800 MHz system to be finalized by Oakland County.

In Memory

Ralph W. Burhans, 78, passed away April 27, 2001. In World War II he was a tech sergeant radio and radar operator in B-17s and

flew 33 combat missions over Nazi Germany. He held a position as a research associate at Sohio Research in Cleveland, originating eight patents. He was a research engineer and lecturer at the Ohio University Avionics Engineering Center, and had more than 70 papers, reports, and articles published in the NASA archives and various technical journals.

He was Station Manager of the mmwave radio telescope operated by the National Radio Astronomy Observatory at Kitt Peak, Arizona during its final construction phases in 1966-1967.

Jack A. McCullough, ex-W6CHE, co-founder of tube manufacturer EIMAC, of Cupertino, California, died April 28. He was 93. An ARRL Life Member, McCullough and Bill Eitel, W6UF (SK), paired up to start Eitel-McCullough - EIMAC - in the 1920s after building a tube for use as a grounded-grid amplifier.

A DXer and contesteer in his younger years, McCullough also was a *QST* author in the 1930s and 1940s, writing mostly about what he knew best - high-power amplifier tubes.

Dyrell "Dale" Marquis, WA4EZU, hamfest cap and badge vendor of Fairforest, South Carolina, died May 14 following an illness and hospitalization. He was 68. An ARRL member, Marquis ran Marquis Engraving and his booth marketing caps and badges bearing call signs or other legends was an institution at Amateur Radio conventions and gatherings throughout the Eastern US.

"Communications" is compiled by editor **Rachel Baughn** from news and clippings sent in by our readers. Thanks to this month's **MT Reporters**: Anonymous, Albany, NY; Fred Chappell, Windsor, ON; N.W. Hill, Arlington, VA; Ken Hydeman, Xenia, OH; Sterling Marcher, La Mirada, CA; Gregory May, Richwood, KY; Ira Paul, Royal Oak, MI; Doug Robertson, Oxnard, CA; Alan Stoddart, Brooklyn, NY. E-mail reporters: Howard Bailen, Bruce Blackburn, Harley Bogart Jr, Chet Copeland, Chanel Cordell, Robert Felton, William Harrison, Maryanne Kehoe, Jorge Rodriguez, Elsa Salldén, Doug Smith, Larry Van Horn, Peter Vieth, Dave White. VOA *Communications World* via Bob Padula EDXP; Ricky Leong, SW Programs, via John Figliozzi

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2001 Fire Season Scanning

By Jon Van Allen KF7YN



Smoke jumpers get ready to leave base at inter-agency fire center in West Yellowstone, bound for duty in Montana fires.

The spring and summer of 2000 brought the Western US some of the most devastating fires in recent history. After a dry and mild winter, conditions rapidly became tinder dry beginning in the southwestern US. The first of the major fires started in New Mexico and severe fire conditions spread to every western US state throughout the summer.

The governor of Montana closed nearly 20 million acres to human travel. This represents an area the size of Massachusetts, New Hampshire, Vermont and Connecticut combined. While this is an enormous area, the images displayed on television gave viewers the impression the entire western US was burning up, which certainly wasn't accurate reporting. But then again, that's why most of us love to monitor – to learn first hand what is really going on.

When the fire season began in earnest in my home state of Utah, I realized my frequency list was outdated. I discovered the National Interagency Fire Center (NIFC) had made some changes. This can be confusing, because the NIFC is a combined fire resource organization of several federal agencies such as BLM, Forest Service, etc., but NIFC is not all inclusive to these agencies nor vice-versa. BLM and Forest Service have many frequencies of their own in addition to NIFC frequencies. In other words, NIFC provides common frequencies for agencies involved in fire-fighting.

To add to the initial confusion, it was obvious there are common frequencies with differing names. For example, a particular frequency called "TAC" by one agency might be called "Command" by another.

Keep this in mind when you find duplications and discrepancies.

While it's impossible to predict how serious the fire season will be this year, it is a safe bet to say there will be fires somewhere. You can almost count on fires in most western states every year to one degree or another, and California seems to get more than their fair share. Already in early March 2001, there were several serious fires in California and Florida.

In addition to NIFC, BLM and Forest Service frequencies, keep on ear on your local fire department frequencies. I was monitoring a fire on US Forest Service land and noted BLM units (including aircraft from other states), County Fire, and the local town's fire department all involved

in the fire-fighting. Local law enforcement was also on scene to prevent people from getting too close and to warn residents of the possibility of evacuation. My scanners were hopping with activity from many different agencies and departments: federal, state, county and local. Table 1 lists NIFC frequencies used in the Western US.

For me, last year was a banner year for fire scanning, especially the fires that broke out in Idaho, Montana and Wyoming. My wife and I spent an entire afternoon at the Interagency Fire Cache located at the West Yellowstone airport. Here air tankers load fire retardant, and fire jumpers deploy to their next fire. As the Fire Cache is open to the public, we were invited to watch and take photos of these exciting operations.



Air Tanker 25 at Inter-Agency Fire Center, West Yellowstone, Montana

Air tankers landed, loaded and took off and came back to reload. Most of them were in action from 8 a.m. to dusk.

I have to say that listening to pilots plan and execute their routes and make their drops has to be some of the most exciting scanning I can recall in 30 years of scanning. There is no room for mistakes, and these pilots are impressive, especially the leader who calls the route and drop procedures. Some of the aircraft they fly are WW2 vintage: truly amazing.

When resources are committed to fighting a fire, a "Victor" VHF air band frequency is assigned so pilots can coordinate with other aircraft. The "FM" VHF (or UHF) frequency for NIFC, BLM, Park Service or Forest Service is also given to the aircraft so they can communicate with ground crews. (Since the VHF air band is AM mode, all other frequencies are "FM" to pilots, whether VHF or UHF).

With so many fires around us in every direction, we heard many more Victor frequencies assigned to new fires as well as ground frequencies. The list of VHF air band frequencies in Table 1 is not a complete list of frequencies which are available if needed, but start with these first.

What's in a name?

As reported in October 2000 *Monitoring Times* "Communications" news, Relm Wireless responded quickly to an urgent request from NIFC to provide 500 Bendix-King 2 way radios. More than once, I heard fire commanders ask specifically for Bendix-King handhelds for their fire crews if any were available. This says a lot for Bendix-King, and it also says a lot for the experienced fire crews who know what communications equipment they want.

Scanning resources

On the road and camping, I use my laptop computer, Percon CD FCC database, *Police Call* on CD and a binder notebook full of notes and frequencies. Updating database files and programming the scanners is a breeze with the laptop. I bought a converter so it will run from 12 volts in the car or the RV.

Portable antenna solutions

I spent a lot of time and effort trying to find the ideal portable scanner antenna that I could get up as high as possible. While camping over the last several years, I have experimented with base and mobile antennas, but it's not always possible to put up a tall mast at any given spot and how to anchor the mast is often a problem. It dawned on me to use trees for masts: the taller the better!

Many of us have put up HF wire antennas using trees as masts, but you can't very well haul a log periodic beam and rotor up a

tree! A simple design is required. I decided to try a coaxial antenna, the results were much better than I expected.

I took a 100 foot roll of RG-6U, stripped off 18 inches of the outer jacket, peeled the braid and foil back so that it went down the coax. I sealed it with electrical tape and heat shrink tubing. From the end of the coax, there are 18 inches of exposed center conductor and 19 inches of braid and foil going down the coax. I stripped off about 1 inch of the center conductor insulation, made a loop and soldered it. The loop is to attach fishing line to the antenna so it can be hauled up a tree. I use a fishing pole with a heavy enough weight so it will go high as possible and also allow it to drop down through the branches. Then I attach the line to the antenna and reel it up as far as I can and fasten the line to a branch. I like to wrap the line around a piece of rubber such as a bicycle inner-tube lining so it won't cut into the tree branch.

A word of caution about using fishing line to pull antennas up. Last summer my wife and I witnessed a raven get its foot tangled up in fishing line. It flew up into a tree and got caught on a branch. Luckily, it picked and gnawed at the line and after a couple of hours managed to free itself. The wildlife people who showed up to try to help the raven said fishing line is a major problem to wildlife, so please, *properly dispose of any leftover line*.

This coaxial antenna is essentially a quarter-wave vertical centered at about 150 MHz. This is a good compromise length for 118-174 MHz. I use a Grove Pre-5A preamp. Let me tell you, this antenna made a huge improvement over any other antenna I have taken on the road! Not because it's that great of an antenna – the added height made the real difference. A 1/4 wave at 100 feet kicks butt over a vertical or discone at 15 or 20 feet. It's cheap, easy, and very effective. An added benefit is that very often the antenna is not easy to spot unless you know it's there.

So, program in these frequencies in addition to your local forestry and fire frequencies, and you'll have what you need to monitor the fire season this year. I would be interested in what you are hearing. You can email me at: kf7yn@qwest.net



Firefighters at the Old Faithful "helibase" at Yellowstone National Park, August 2000 (photo by Karen Van Allen)

Table 1

Frequency	Use	User Specifics
122.850	NIFC	VHF-4 Helicopter Ops
122.900	NIFC	VHF-2
122.925	NIFC	VHF-1
122.975	NIFC	VHF-3
123.025	NIFC	Helicopters - Air to Air, Air to Ground
123.050	NIFC	VHF-6
123.075	NIFC	VHF-5
122.925	NIFC	Helos & fixed wing - Air to Air, Air to Ground
135.975	NIFC	VHF-7 Low Altitude / Airtanker Bases
163.100	Govt	ALL-CALL (common calling channel)
166.6125	BLM/Forestry	Command-4 Repeater
166.675	NIFC	Air Tac-1
166.725	BLM	Tac-1
166.775	BLM	Tac-2
167.100	BLM/Forestry	Command-5 Repeater
167.950	NIFC	Air Tac-5
168.025	Forestry	Law Enforcement
168.050	Forestry	Tac-1
168.075	Forestry	Command-3 Repeater
168.100	Forestry	Command-2 Repeater
168.200	Forestry	Tac-2
168.250	BLM	Tac-3
168.350	Govt	ALL-CALL
168.400	NIFC	
168.475	BLM/Forestry	Command 6 Repeater
168.550	NIFC	Incident Command Callup
168.600	Forestry	Tac-3
168.625	NIFC	Air Net (guard)
168.650	NIFC	Flight Following
168.700	Forestry	Command-1 Repeater
169.150	NIFC	Air Tac-2
169.175	NIFC	Command Net
169.200	NIFC	Air Tac-3
169.350	BLM/FAA	
169.750	BLM	Air-Ground F-6
169.875	NIFC	Command Net
170.000	NIFC	Air Tac-4
172.600	NIFC	Safety
173.8125	NIFC	Command 6
408.400	Forestry	Common User
414.650	Forestry	Logistics-1
415.400	Forestry	Logistics-2
415.500	Forestry	Logistics-3
417.300	Forestry	Logistics-4
417.350	Forestry	Logistics-5
417.500	Forestry	Logistics-6
417.800	Forestry	Logistics-7
418.050	BLM	Common User
418.075	Forestry	Common User

A Monitor's Guide to Maps

By Bob Felton

At Fifth and Main, according to a Skywarn monitor, the wind is snapping-off 2-inch tree branches. Minutes later, a different monitor reports that aggie-sized hail is hurtling almost sideways at Church and Market. At the university, a ham reports, a dormitory window has blown out, the sirens are screaming, and everybody is making tracks for the basement. Across the street, the neighbors are wondering if the storm is going to beat their home to smithereens. But you've been tracking the reports, plotting them on a map, and you already know: the core of the storm has missed you.

A fancy antenna is nice, the latest electronic directories are helpful, but maps are indispensable. Not only do they provide information that can assist your monitoring, they sometimes allow you to see the otherwise hidden logic of an event. Shortly after moving to Wake Forest, for example, I was idling through the local frequencies and overheard a report of a police pursuit of an armed assailant. The street names were meaningless to me, so I reached for a local street map I'd picked up. For the next hour I monitored the chase, and as time went by I realized the police were deliberately steering their man toward a golf course – where K-9 units were

waiting. That experience taught me something I hadn't known about police work, and taught me something about monitoring, too: always keep good maps handy.

We're all acquainted with the familiar city street map, but there are many other types that are useful to monitors: topographic maps, nautical and aeronautical charts, even cooperative advertising maps of the sort used for place mats in diners. Maps aren't for just scannists, either; SWLs who make a habit of consulting an atlas while listening to the news will gain a better understanding of remote events.

Get street-wise

Every scannist should have a good local street map. Ideally, you should select a map that has not only street names, but land-

marks: schools, subdivisions, churches, police and fire stations and other municipal buildings and structures, water courses, and parks. Police often use those names in calls, and you don't want to be unable to locate Bushwhack Acres while listening in as every cop from miles around races there.

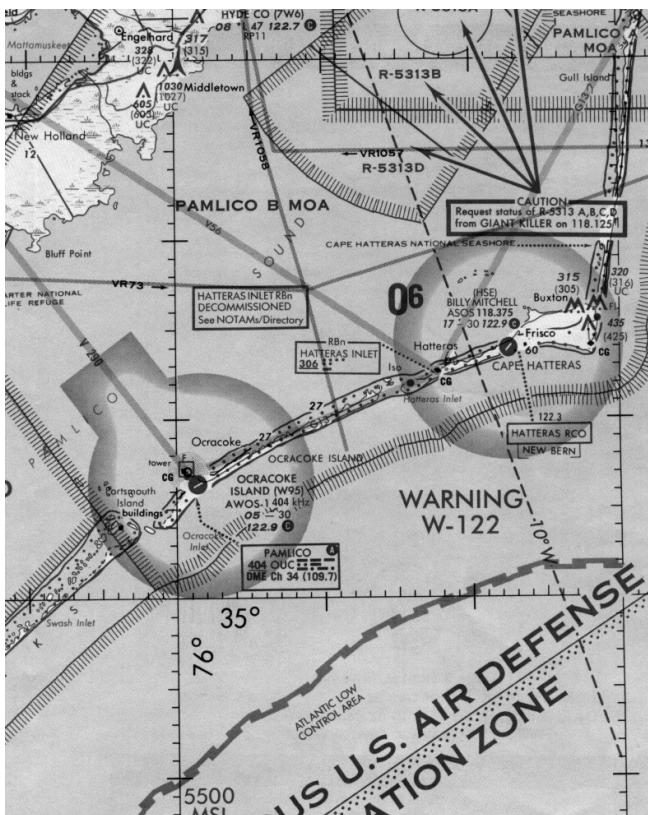
Fold-up maps are a poor choice for the shack, because it's a bother to flip from one side to the other while trying to locate somewhere. Further, such maps are often out of date. A better choice is a bound book with detailed maps of small areas and a good index, of the sort prepared specifically for salesmen and other folk who spend a lot of time on the road. Most office supply stores carry them, at a cost of about \$15.

If you have a computer in your shack and are willing to spend a little more, Microsoft and DeLorme produce nationwide street atlases annually that cost about \$40. Since electronic maps will usually prepare alternative scenic, fastest or shortest trip routes (DeLorme even has an online service that allows you to check road conditions along your route, or interface with a GPS unit), they may actually pay for themselves and spare you a lot of aggravation. These maps usually will pinpoint a specific address for you, too.

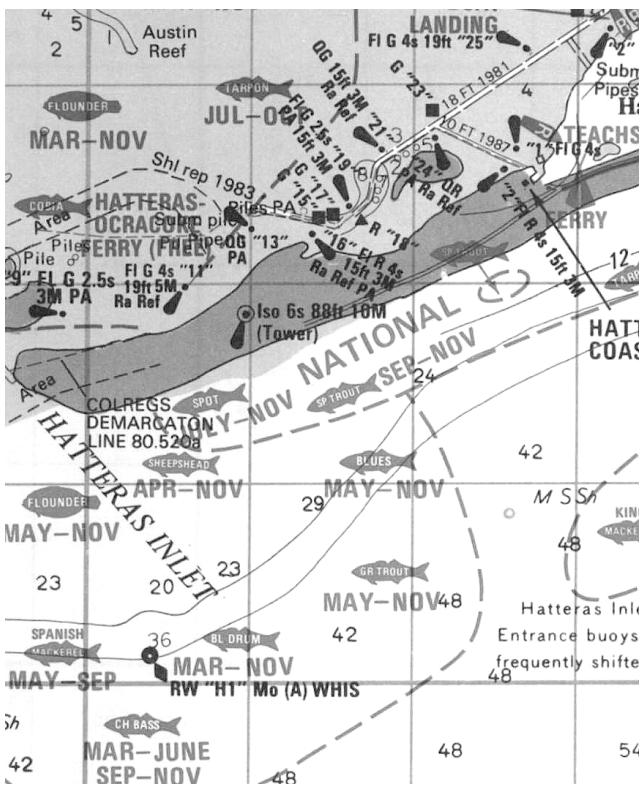
Brush up on topography

A second type of map that comes in handy is a topographic map, which shows the rises and dips in the earth's surface with lines that connect adjacent points having the same elevation. The maps may also show features that often don't appear on street maps: family cemeteries, old logging roads, swamp land, transmission towers, ravines, etc. These are good to have when monitoring searches for escapees and missing persons, or for forest service activities, because the radio traffic will reference landmarks that don't appear on an ordinary street map.

Outfitters sell these maps or, even bet-



A sample aeronautical chart of Cape Hatteras



A sample maritime chart Cape Hatteras

ter, you can download them at no charge from the Internet (<http://www.topozone.com>). They may also be bought directly from the United States Geological Service, at a cost of \$4.00 each. Not only are they useful, they look good hanging on the wall.

The birds-eye view

Yet another type of map worth keeping at hand is an aeronautical chart. These colorful maps show the location of every airport in the covered area, and provide detailed information about communications frequencies in use. For longwave buffs, they even show non-directional beacon locations and provide a dot-dash representation of the beacon's signal. Additionally, they delineate the air defense zones surrounding military bases that pilots must avoid.

Though street maps might go years without an update, aeronautical charts are updated every 56 days – and pilots stand to land in big legal and licensure trouble if they use out-of-date charts. You can, though, and it's likely that the frequencies enumerated on your chart will be valid for a long while to come. When purchased from Uncle Sam an aeronautical section costs \$7.50. Many states' transportation departments provide annually-updated non-navigation-grade charts to the public at no cost, however. It's worth a call to DOT headquarters.

If you spend a lot of time on the road, you might like to pick up the current Airport/Facility directory for your part of the country. The size of a small phonebook, these handy

guides provide detailed communications information for every airport in a multistate area. Like aeronautical charts, they have a nominal life of 56 days, though in truth you can expect to glean useful information from them for years. The current cost for the directories is \$4.15 each.

This'll float your boat

If you live near navigable waterways, you should consider picking up the nautical chart that covers your area. The current chart will suit your purposes for years, even though, just like aeronautical charts, they quickly go out of date. They detail the locations of buoys, lights, navigation beacons and other reference points used by mariners. Odds are that your city map won't enumerate every ramp, ca-

nal, point and sandbar, and you won't have the slightest idea where the Coast Guard is going if you don't have a chart. The current cost of a nautical chart is \$17.00.

Not just for tourists

When vacationing, always ask for an extra copy of those cooperative advertising place mats used in the local restaurants, the sort that have a local map with the names of local businesses. Police in small towns, especially, often identify the location of an event according to the nearest business name, e.g., "The wreck is right in front of Mama's Barbecue." An advertising map might have just the information you need to get a great action photo or avoid a traffic jam that wrecks the last day of your too-short vacation time with the family.

Get the big picture

If scanning's not your thing, but you really like listening to the shortwave bands, then you need a good atlas. The one that sits next to my radio is the *Essential World Atlas* from Dorling Kindersley; it's a handy desktop size, has beautiful digital maps that include relief, and costs \$14.95. Besides political boundaries and relief, there are maps that delineate time zones, language usage, predominant religions, population and life expectancy, climate, and ocean currents.

If you can't spend that much, think about picking up the current edition of *The World Almanac and Book of Facts*. The maps aren't nearly so nice, but this book provides good, brief descriptions of every country on earth: economics, agriculture, political structure, recent history, demographics. It can usually be purchased for under \$10 at places like Sam's Club.

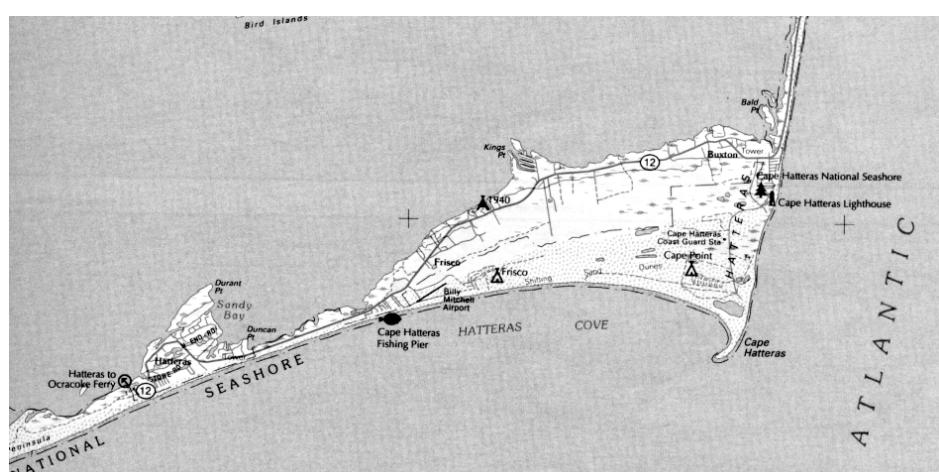
Listening in time and space

Past *MT* articles have emphasized the importance of maps in identifying distant signals that arrive at your scanner via skip propagation, and this summer will no doubt produce the usual crop. This makes it even more important to become familiar with your home territory so you'll know when you're hearing something exotic.

But, forgetting all the practical reasons for introducing maps into your monitoring – once you connect the voices you hear with where the action is taking place, you will have introduced an entirely new dimension to your hobby. The experience will forever alter how you listen to what you hear.

About the Author

Bob Felton is a Technical Editor for "InTech" magazine, and a freelance writer. He may be contacted at bob@bobfelton.com.



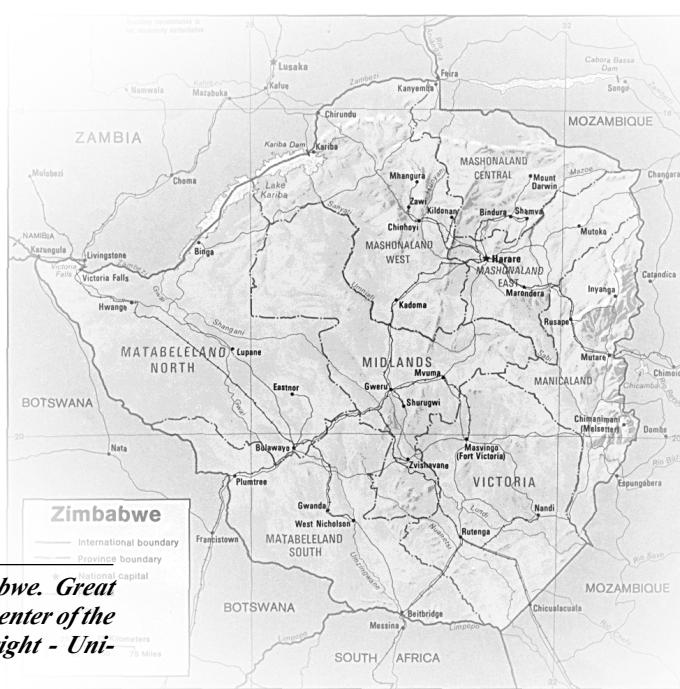
A sample topographical chart Cape Hatteras



Broadcasting in Zimbabwe

by Colin Miller

A map of contemporary Zimbabwe. Great Zimbabwe is located toward the center of the Victoria District, on the lower right - University of Virginia



One of the greatest mysteries on the African continent is of such significance, that the country in which it is located bears its name. The site was suitable for a king, an oasis in the wilderness of Africa, with pleasant breezes blowing up the valley to produce a mild and healthy climate. It was discovered in 1867, and opinions as to its age vary. Some think that it dates to the time of the Biblical King Solomon: others, to just a few centuries ago. However, radioactivity tests have determined that it is about 1,000 years old.

The mystery site is a complex of massive stone structures known as Great Zimbabwe, located about 20 miles southeast of Masvingo, formerly Fort Victoria. The civilization must have been quite large, as there is evidence of major trading activities within southeastern Africa. The name Zimbabwe is derived from the Shona maDzimbabwe, meaning "a great stone building." The first Bantu are thought to have reached Zimbabwe from the north between the 5th and 10th centuries AD. The stone ruins of Zimbabwe date mainly from about the 9th century, and Great Zimbabwe appears to be Bantu in origin.

The Republic of Zimbabwe is a landlocked country, and lies in south central Africa. Zambia borders it to the north, Mozambique to the east, South Africa to the south and Botswana to the west. The northwest corner touches Namibia, where the borders

of Botswana, Namibia, Zambia and Zimbabwe meet. The area is about 151,000 square miles, or somewhat larger than Japan or Montana, but smaller than California. The population is about 11-1/2 million, of which 98% are Africans and 2% Europeans or Asians. English is the official language; Shona and Ndebele are the main African languages.

The climate is tropical, with the lowveld being hot and humid. The highveld, along the central plateau where most of the major towns are situated, has more moderate temperatures. This forms the watershed for the two great rivers of Zimbabwe, the Limpopo along the border with South Africa, and the Zambezi along the Zambian border. The world's largest man-made lake, Lake Kariba, is situated on the Zambezi. The rainy season occurs during spring and summer, from September to March. Zimbabwe has seen droughts as well as severe flooding in recent years. Mining is a major industry, including coal, chromium, asbestos and gold. Other major industries include steel manufacturing, clothing and foodstuffs. Agriculture accounts for about 18% of the GDP. Recently there was a dispute between White farmers and the government following a decision to nationalize their farms.

Portuguese slave traders were active from the 16th century. About 300 years later, mineral concessions were granted to Cecil Rhodes (1853-1902) and the area became a British protectorate in 1888. Rhodes was a statesman and

financier, making his fortune in diamonds. Many consider him to be the man who has had the greatest influence on the history of the African continent. The British South Africa Company governed Rhodesia until 1923, when it was divided into Northern and Southern Rhodesia, now Zambia and Zimbabwe respectively.

In 1961 a constitution was promulgated, which provided for White rule in Rhodesia. On November 11, 1965, the then Prime Minister Ian Smith unilaterally declared independence from Britain. This was not recognized by the British government, which demanded voting rights for the African majority. The United Nations introduced sanctions, and a guerilla war followed that would ultimately claim the lives of thousands.

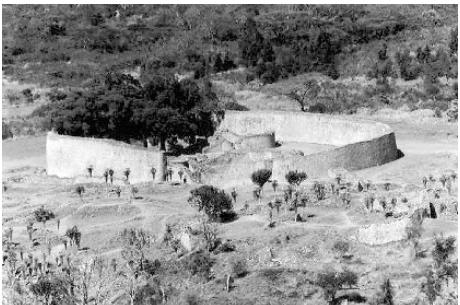
Broadcasting history

At the end of 1965, the BBC set up a relay station in Francistown, not far from the border in neighboring Botswana. This station used a 10 kW short-wave transmitter and relayed both the World and African Services. Whenever the current affairs program *The World and Rhodesia* was broadcast, the station was heavily jammed by the Rhodesian authorities. The BBC station eventually closed in 1968.

Broadcasting began in 1932, when stations were opened in Salisbury and Bulawayo, using callsigns ZEA and ZEB respectively. During World War II, studios were built in the old Post Office building on Manica Road in Salisbury. Early editions of the *World Radio Handbook* indicate shortwave use by 1 kW stations at Salisbury and Bulawayo, and 1.5 kW transmitters at Gwelo and Umtali.

By 1954 the shortwave facilities had been upgraded to two transmitters of 7.5 kW and one of 300 watts at Salisbury. A chain of 2 kW medium wave stations was established in towns along the main railroad route. For economic reasons, these facilities were installed in existing Post Office buildings and linked to the main studios by telephone lines.

During the fifties, the Central African Fed-



The ruins at Great Zimbabwe. Photos Courtesy of George P. Landow

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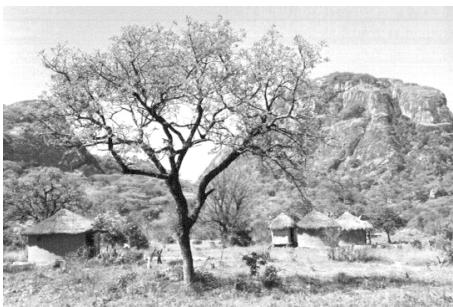
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In the lowveld, agricultural potential is fairly limited and intense heat is constant. Great Zimbabwe probably developed in this area because it occupied the transit route between the Zimbabwean plateau and the Indian Ocean coastline - courtesy, University of Virginia

eration of Rhodesia and Nyasaland was created, consisting of present-day Zimbabwe, Zambia and Malawi. The Federal Broadcasting Corporation was set up in 1958 and was modeled on the BBC. It existed until the end of 1963 when the Federation was dissolved prior to the independence of Malawi and Zambia. Southern Rhodesia then became a separate country, and the Rhodesia Broadcasting Corporation was formed.

In the early sixties, all shortwave operations were centralized at the Guinea Fowl site near Gweru. This station is situated almost at the geographical center of Zimbabwe. The first transmitters were rated at 10 and 20 kW. High-powered Thomson transmitters of 100 kW were added in 1968. Vertical-incidence omnidirectional antennas served an area within a 200-mile radius of Gweru.

Also in 1968, the RBC expanded its services further with a number of local community stations. The first of these was known as Radio Jacaranda in Salisbury, named for the purple-blossomed trees that line its streets in

September and October. This was followed by Radio Matopos in Bulawayo. The Matopos is a hilly area near the city, and also the site of Cecil Rhodes' grave. The last local station, Radio Manica, was located in Umtali, a picturesque town situated on the Mozambique border.

In 1975 the first FM station opened in the Salisbury and Bulawayo areas and the network was gradually expanded to 22 stations covering the whole country.

Zimbabwe's changing social scene

Zimbabwe gained its independence on April 18, 1980, and Robert Mugabe was elected Prime Minister. He has been the country's only ruler since independence. Majority rule was established at last, following many years of White domination and the guerilla war.

After independence many towns had their names changed. Salisbury was called Harare, Gwelo became Gweru, and Umtali was renamed Mutare. The Zimbabwe Broadcasting Corporation (ZBC) was created, and is the sole broadcasting authority in the country. Shortly after independence the radio services were reorganized. The General Service was renamed Radio 1, while the African Service was known as Radio 2.

Today, the ZBC operates four radio channels. Radio 1 broadcasts for 19 hours a day in English, thus covering a broad spectrum of listeners. Programs include news and information, a variety of music, light entertainment, sport, comedy, quizzes and drama.

Radio 2 also broadcasts for 19 hours a day, in Shona, Ndebele and other vernacular languages. The station serves the majority of the rural and urban population that is largely Black. Two thirds of music played on Radio 2 is produced locally. The station's program lineup includes discussions, features and drama on social, cultural, sporting and economic issues.

Radio 3 is a 24-hour commercial music

station aimed at the youth. It provides fast-paced music, entertainment, information and education. The majority of its listeners are young people who are highly receptive.

Finally, Radio 4 is an educational channel, which broadcasts for 19 hours a day in Shona, Ndebele, English and the minority languages of Chewa, Tonga, Venda, Kalanga and Shangani. The audience demographics depend on the nature of the educational programs being broadcast at the time. Radio 4 works closely with the Ministry of Education's Audio Visual Services, as well as other relevant government ministries and non-governmental organizations.

Shortwave transmissions were temporarily discontinued in 1991, as it was felt that the country was adequately covered by FM transmitters. However, in October 1994 relays of Radio 1 and Radio 2 were resumed on a test basis, and on December 5 President Mugabe officially inaugurated the shortwave service at the Guinea Fowl site near Gweru. The site now consists of two log-periodic antennas and two Continental 100 kW transmitters.

The official shortwave schedule is as follows:

Radio 2 in Shona, Ndebele and English:
0300 - 0530 3306
0530 - 1630 6045
1630 - 2200 3306

Radio 4, an educational channel in English:
0300 - 0530 3396
0400 - 0530 4828
0530 - 1630 5975
1630 - 2200 4828 3396

However, according to monitoring observations made in February and early May at Sentech in South Africa, the only frequency in use is 6045, carrying Radio 2. It would appear that this channel is in use during the whole broadcast day from 0300 - 2200 UTC. So, ZBC must be having problems with one of its transmitters.

The Future

Today the country is facing a struggling economy, resulting partly from droughts, floods, its involvement in the war in the Democratic Republic of the Congo, and also the high incidence of AIDS. Inflation stood at about 60% in 1999.

In the year 2000 the Supreme Court passed a Bill that would end the government's monopoly on broadcasting. The ZBC is planning to commercialize more of its services in preparation for the competition which will arise. Under the new law, only one independent radio station will be allowed to compete with ZBC, as well as one new TV station. Pirate broadcasters would face a heavy fine.

Zimbabwe thus provides a challenge for DXers in North America. Your best bet would be to sign on 0300 on 6045, but RFI Paris in Russian to Europe might cause some QRM. Good luck!



ZBC QSL card from Roger Roussel, courtesy www.antique-corner.com/SWLQSL

KJES

By Hans Johnson

Mark Twain said, "It's not the things you don't know that hurt you, it's the things you think you know that just ain't so."

KJES, an American shortwave station in New Mexico, suffers from this. Listeners who have only briefly tuned into the station are quick to dismiss KJES as a cult. Just a few minutes of listening to the same bits of scripture repeated over and over again and some have already drawn a conclusion. Others assume this characterization to be true even though they have never heard the station themselves.

Yet the reality is much different. For openers, KJES isn't run by a cult; it is actually run by a Roman Catholic organization. In addition to the shortwave station, they have ministries in El Paso, Texas, and Juarez, Mexico.

Programmed to Suit

A staff of volunteers runs the day-to-day operation of KJES and the programming is actually quite low-key. There isn't any ranting and raving, and KJES certainly isn't badgering anyone for money. KJES puts out a fine signal with nice audio and is almost always free of any technical problems. Personally, I find the vocal music they offer to be quite nice.

The station has very good reasons for repeating the scripture over and over again. I asked them about this and their reply is worth quoting:

"We have found that this technique has worked when we take the Gospel to a Mexican jail and mental hospital that we visit every week. We have found that by frequently repeating certain Scriptures, the bondage over the jail, for instance, is lifted and we are able to evangelize successfully. We have experienced this for many years and so now we are

trying to penetrate the darkness that envelops much of the world we experience."

Another interesting aspect of KJES is who is allowed on the air at the station. With some American shortwave outlets, a fistful of dollars and a tape will get you on the air. On the one hand, this is great free speech. On the other hand, it has at a minimum let some awfully bad programming hit the airwaves. At the worst, it has stigmatized both the American shortwave broadcasters and listeners as doomsdayers and right-wing fanatics.

KJES will let you on for free. The catch is that you have to preach, can't give your name and/or address, and cannot ask for any money. I don't think they have had any takers so far.

On the Technical Side

KJES came on the air in June of 1992 with a 50,000 watt transmitter made by ELCOR in Costa Rica. This was matched with a Create Design rotatable log periodic antenna made in Japan. It's also worth noting that if you hear them with a weaker than normal signal, they might be on their 20,000 watt back up unit.

Transmitter problems caused a lot of frustration that first year as the transmitter was a prototype for ELCOR, the first 50 kW they had ever built. Things are a bit better now that all the bugs have been ironed out.

KJES can be heard as follows. English is at 1400-1600 UTC on 11715 kHz, 1900-2000 on 15385, and 0200-0330 on 7555. Spanish is at 1600-1700 on 11715 and 2000-2100 on 15385. All of their transmissions are heard fine in North America. In Europe, their 0200 broadcast is probably the most easily heard.

KJES' address is The Lord's Ranch, 230 High Valley Road, Vado, NM 88072. The station is just a few miles off of I-10 off the Vado exit if you happen to be in the area. The telephone number is (505) 233-2090 and the fax is



A stamped index card filled in by hand serves as the KJES QSL card – this one for the backup 20 kW transmitter.

(505) 233-3019. The station does not have a web site or email address.

Tune them in; you might just be in for a very pleasant surprise!



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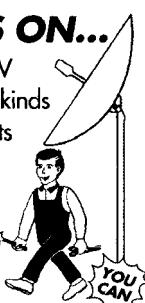
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 **Skyvision**

A "folded" Folded Dipole Antenna for VHF/FM

By Richard Q. Marris G2BZQ

The folded dipole has been with us for many years. In the HF spectrum, it is usual to construct it using 300 ohm twin ribbon feedline. At higher frequencies tubing, rod and metal strip is often used.

The basic concept is shown in Figure 1, and its simplicity becomes clear. It consists of a half-wavelength of 300 ohm twin ribbon feedline, joined together at the ends. The middle of one side is broken, and the impedance at that point (x-x) is 300 ohms. So, the feedline can also be 300 ohms, which is taken to the receiver and/or transceiver. The bandwidth is broader than the conventional dipole. It is a quite docile antenna in use.

When it comes to reception of VHF/FM stations on 88.1 to 107.9 MHz, the folded dipole often appears in some of the multi-element arrays made of metal tubing, rod or strip.

However, for reception of the VHF/FM band indoors, or maybe on vacation, you can use a common variety of low-cost ribbon feedline (300 ohms), available from a number of suppliers and manufacturers. (See Figure 1.) The performance of this feedline can range from excellent to poor, depending on height,

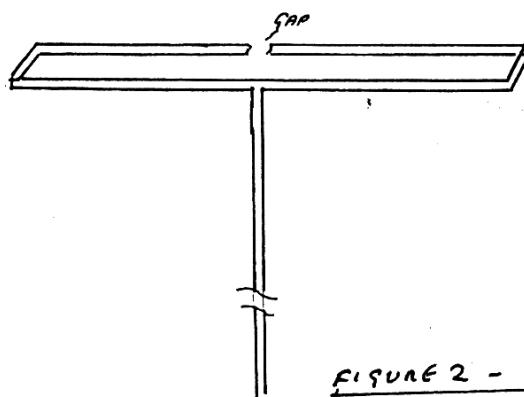


FIGURE 2 - THE "FOLDED" FOLDED DIPOLE

surrounding objects, and in-home interference. This feedline forms the basis of this project.

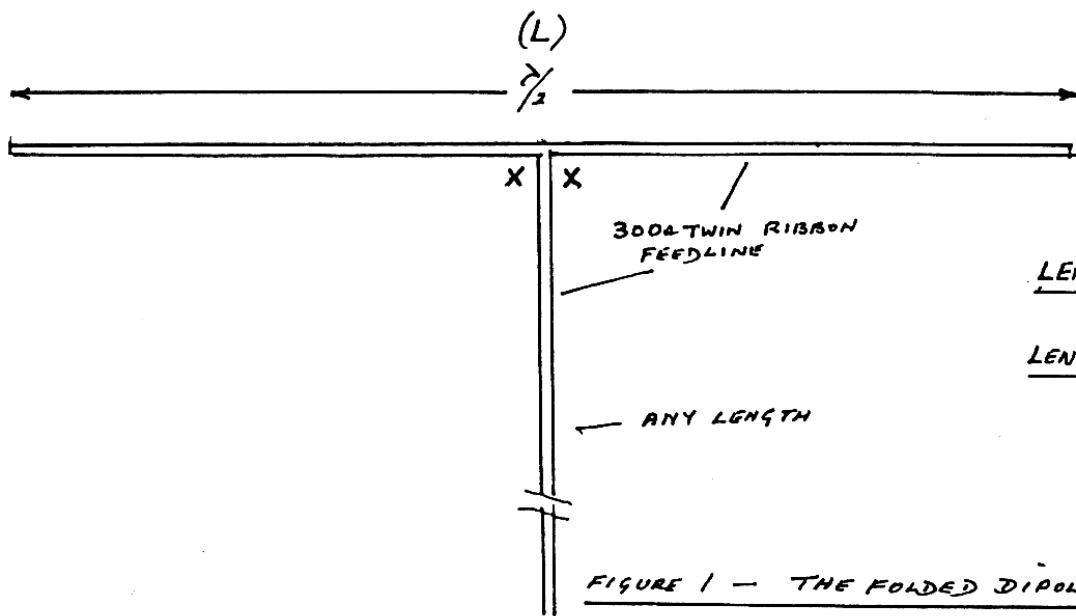
Construction

A typical 88.1 - 107.9 MHz dipole is around 57.5 inches long. It consists of 300 ohm twin feedline with a plastic molding at each end. In the center is a plastic "T" molding enclosing the feeder, which goes to the

RX. Each of the three moldings has a small pinhole through it, which could be used for pinning the antenna to a wall, or for connecting thin cord for support between two suitable supports. The cost of this device was about the price of 2 or 3 beers.

The general arrangement can be seen in Figure 1.

On connecting the antenna to a VHF/FM receiver, it may work extremely well or just



$$\text{LENGTH(feet)} = \frac{468}{f \text{ MHz}}$$

or

$$\text{LENGTH(meters)} = \frac{143}{f \text{ MHz}}$$

FIGURE 1 - THE FOLDED DIPOLE. (CONVENTIONAL)

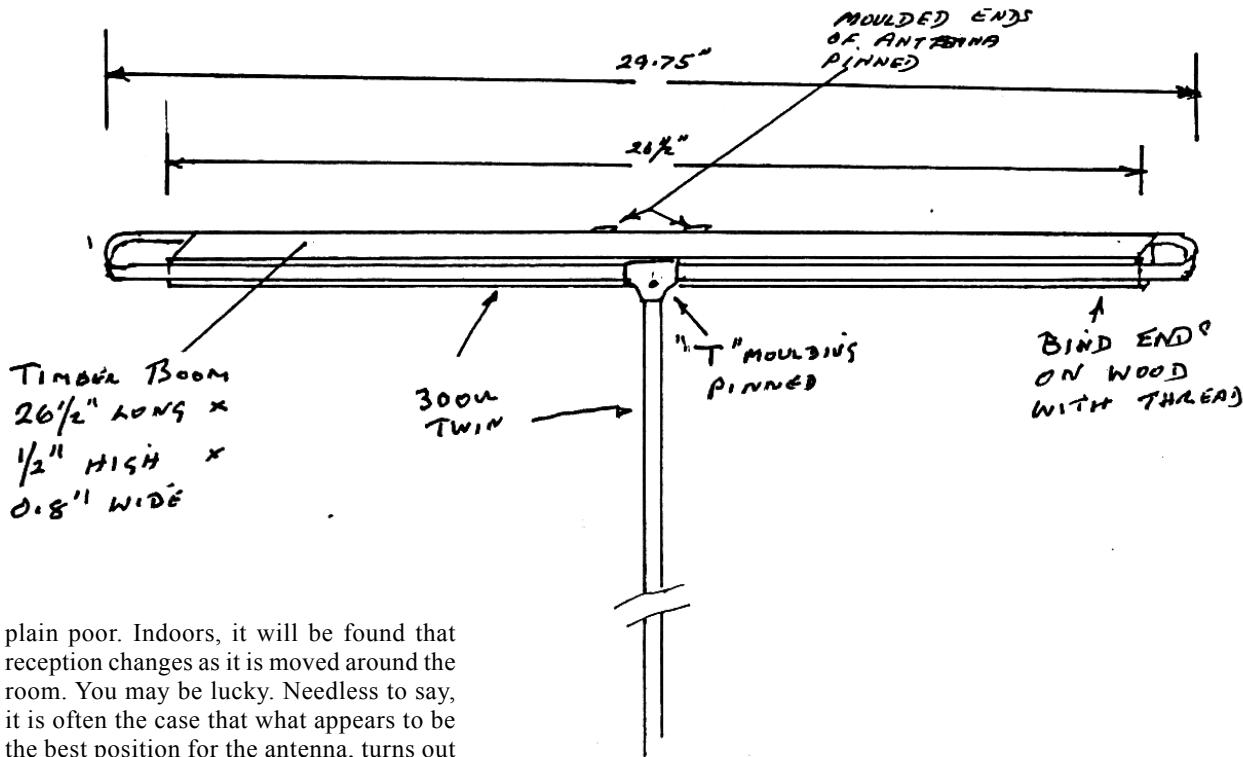


Figure 3 = THE RIBBON FOLDED DIPOLE VHF/FM
(37.5 TO 106 MHz) ANTENNA,

plain poor. Indoors, it will be found that reception changes as it is moved around the room. You may be lucky. Needless to say, it is often the case that what appears to be the best position for the antenna, turns out to be the most inconvenient to support it. Again you may be lucky! Unfortunately, pinning it to a wall often results in interference from in-house wiring or just plain damping of signals.

A dipole antenna is a half-wavelength long. Of this, the center quarter wave is high current, with the ends being the high voltage points. So, in simple terms, it is the center quarter wave which does most of the work. Furthermore, the dipole is directional, with the maximum signals appearing on the long side and minimum signal at the ends.

So, if the ends were folded down or back, one could halve the antenna length, fasten it to a simple structure so that it could be rotated, and hopefully solve all the problems in one go.

Figure 2 shows the concept of the "folded" Folded Dipole. The end result produced a rotatable, simple antenna just 29-3/4 inches long, mounted on a simple timber framework. (See Figures 3 and 4.)

The mounting frame (Figure 4) consists of a simple timber boom arm 26-1/4" long x 1/2" deep x 0.8" wide. A length of wood dowel about 3/4" diameter is screwed and glued at the center, as shown. This can be any convenient length, and can be inserted into a heavy base, into which a 3/4" diameter hole has been drilled, so that the boom can be rotated.

Next the ribbon antenna is wrapped around the boom as shown in Figure 3. It can be held in place with a pin in the center molding, with the fold back ends bound on with thread or tape. The antenna end moldings should be pinned to the timber boom arm, as shown.

could now be moved around, away from such offending items as house wiring, hidden metal pipes, hidden metal building structures and windows.

So, here is a simple, very low cost project which is worth trying out. It may solve some of your problems, if you are faced with a "no outdoor antenna" regulation or just need an antenna for vacations.

And, of course, you may well be able to rotate it, and receive that obscure VHF/FM station which is located in an inconvenient direction for the present antenna.

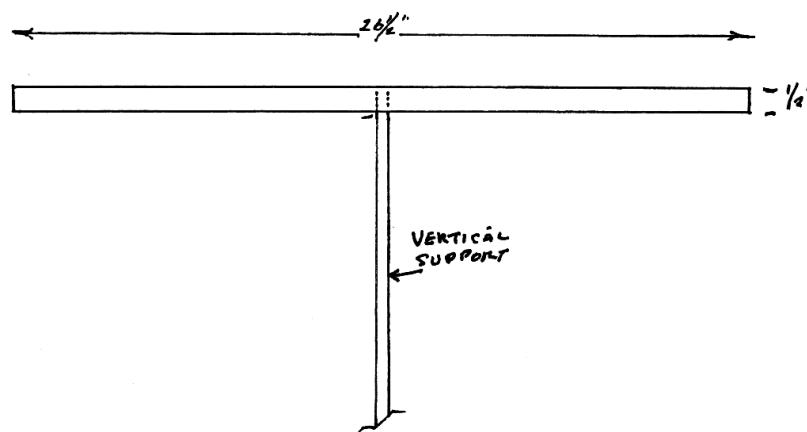


Figure 4 = MOUNTING BOOM FOR FIG 3

Listening to the Grand Old Game

By Ken Reitz

On the surface America's baseball industry looks as stable and solid as the buildings on Wall Street. During the off season dollar signs dominated baseball news as record salaries were lavished on a handful of players and the umpires decided to tweak the strike zone. To be sure, ominous clouds loomed as the season began. There's talk of "contraction" i.e. shrinking the current list of baseball cities; talk of a mid-season player strike; and, in a new twist on Internet baseball listening, fans were required for the first time to pay for on-line listening on their personal computers.

Last year each team hosted its own web site which gave both leagues a sense of individual and regional flavor. The sites were as varied and interesting as the teams they represented. This year Major League Baseball (MLB) has required all teams to submit to their own uniform web site design which is done by one company for all the teams of Major League Baseball. This scheme includes gathering all web broadcasts under one umbrella.

Now, for a one-time season fee of \$9.95, baseball fans are required to sign up in order to receive any MLB radio broadcast offered on the web. Last year all of such broadcasts were free of charge. Major League teams don't appear to be entirely happy with the new arrangement nor do the many network flagship stations who, until this year, were offering the product on their own

websites. A New York Yankees spokesman said questions about the League's Internet activities should be directed to the League itself.

Jim Gallagher, Sr. VP for Corporate Communications at MLB.com says they've signed up 125,000 fans as of mid-May, but won't talk about target numbers. Of the program he says, "We certainly believe it's a success and expect our subscription base to grow..." He says that "...it's really the dis-



No matter where you are, there's a Major League Baseball game within earshot. By radio or by web, you can have a front row seat, but it may not be free.
(Photo by Harry Baughn)

placed fan we're aiming at. The fan who can't get AM transmissions either because of distance or work environment." Gallagher points out that the \$9.95 fee includes a \$10 coupon which can be used at the **MLB.com** store for fan collectibles.

What happens in the post season? Gallagher was not sure, but fans may have to spend a little more for the playoffs and World Series.

Meanwhile, web space now allowed teams is fairly limited compared to last year.

A team such as the Atlanta Braves, which has the largest number of radio affiliates for its broadcast network, used to post their entire affiliate list on the web. At the beginning of the season they noted the list's absence and in an email wrote "...we hope to add that to our website as soon as MLB gives us the added page..." Two months later they still didn't have the space.

A few teams have posted their affiliates list, but fans wishing to see a complete list of radio stations for the 2001 Major League Baseball season can do so on the *Monitoring Times* website <http://www.monitoringtimes.com>. This list is of particular use for AM band DXers trying to confirm graveyard frequencies. A complete list of the flagship stations (English and Spanish) for all Major League teams is found below.

There are a number of changes in the broadcast list this year. A few flagship stations have changed; as of this writing the Montreal Expos still did not have an English broadcast affiliate; there are more Spanish language networks on the air

this year; and some networks have shrunk while others have grown.

In general, team prosperity is mirrored in the number of affiliates. Troubled Major League franchises such as Montreal (1), Tampa Bay (12), and Florida (11), have the shortest lists, while a nationally popular team such as the Atlanta Braves enjoys the longest affiliates list (160 stations). Coastal teams appear to have fewer radio outlets than teams in the nation's heartland which have a wide geographic

area from which to draw, almost regardless of their ability to win. Perennial cellar-dweller Kansas City Royals (AL) has one of the biggest radio networks in baseball with 74 affiliates. While the Yankees (AL) have a only a moderate number (35) in their list, each station covers a more dense population, amounting to a larger listening audience than the Royals.

Tuning into the flagship stations listed below is relatively easy. Most are 50 kW power houses on clear channels which means they have little domestic frequency competition. There are some exceptions. Among the 5 kW flagship stations which will be a challenge for most listeners are WFLA Tampa; KMBZ Kansas City; WQAM Miami; KABL Oakland; KTAR Phoenix and KOGO San Diego. Milwaukee's WTJM transmits 50 kW during the day but switches to 10 kW at night, while Miami's WQAM starts the day at 5 kW and drops to 1 kW at night. The only station going up in power at night is Los Angeles' KXTA which is 5 kW during the day going to 44 kW at night. Probably the hardest catches will be the lower output Spanish language stations which are at the high end of the AM dial.

In all, well over a thousand radio stations are transmitting baseball to all three countries comprising North America. With a good antenna, a decent radio, and an electrically quiet listening post you may be surprised at all the stations you can receive. Here are a few tips to help you tune into the "grand old game."

Most games during the week are night games which start at about 7:00 p.m. local time. On the weekend, games can be either day or night games with most Sunday games being day games because most teams plan to have a three game series over the weekend and use Monday as a travel day going to the next city on the schedule. Day games usually have a start time of 1 or 3 p.m. local time. Your best chance of catching West Coast games if you live on the East Coast will be during the week with West Coast games starting at 10 pm ET. West Coast listeners will have a much harder time catching East Coast baseball action because most games will have finished before or just after local sunset Pacific Time.

If you're looking for a particular team, check out Chart #1 which lists the flagship stations by team. If you're dialing around the AM band at night looking to log the flagship stations, use Chart #2, which lists the flagships by frequency. Remember too that most baseball networks pause for local station ID at the top of each hour. This is the perfect time to log those rare AM catches.

Memories from Recreated Baseball Game Broadcasts

By Harold Driscoll

These are a few memories from the 1950s, about broadcasting baseball games of the Rochester NY Red Wings – a triple A ball team one step down from major league baseball.

Broadcasting home games was the same back then as today. But, broadcasting Red Wing road games was a different matter. All broadcasts were done from information sent via Western Union teletype.

A teletype operator sent game information from the out of town ball park. A second Western Union teletype operator was stationed in our broadcast studio. (The studio being that of the once-local radio station WVET. Its call letters have long since faded into history.) This operator would hand teletype game info to our game play-by-play announcer, Tom Decker, who in turn cued me what play was coming up so I could have the right sound effect ready. My job was that of technical producer.

The Quest for Realism

Improvements were always in order. For one thing, we needed to change our general background fan sounds; ours had too many of the same sound repeats over and over.

The solution to this problem seemed easy enough: record fan sounds between games of a two-game double header, since there was always a twenty minute rest period between games. We'd take a tape machine atop Silver Stadium (our home stadium), and record the effects easy enough, or so it seemed.

But alas! It proved not easy enough. Not by a long shot. Quality broadcast tape recording machines of 1950s days were heavy and bulky, unlike those of these modern hi-tech days. Our recording mission proved to be a real chore.

Fortunately some helpful fans took pity on me – a skinny twenty three year old attempting to carry the two part Magnecord tape machine up the narrow, winding, and steep steps to the top of the grandstand. Thanks to them I finally got there.

But blast! The best of plans can go awry. It seems some fan went out to the parking lot with but one thought in mind: to lean on a car horn throughout the entire twenty minute break between ball games! Needless to say there was no background sound recorded that day. (I must give some credit. After over forty years have passed I still think of that fan, whoever he may have been, and get a chuckle.)

We tried it again a different time with success – again, with the assistance of helping fans.



MT contributor Harold Driscoll – as colorful today as when he was recreating baseball games for radio.

Foul Plays

Another memorable time comes to mind. When a crucial three ball, two strike pitch was about to be delivered, suddenly our studio's Western Union teletype machine stopped running.

The reason was quickly discovered. The cleanup lady! She would always go about her tasks quietly enough; but without her realizing it, the broom pulled loose the machine line cord. There followed a few grimacing moments; a scowling play by play announcer, a harried Western Union operator, and a bewildered clean up lady.

The batter saved the day, hitting foul balls!

Then there was that game from Montreal. Tied three up in the bottom half of the ninth, Montreal was at bat and needed but a score to win the game.

It happened! A home run! Montreal wins by a run! All that remained to do was just a wrap-up of this night's ball game, and another successfully recreated game would be history.

But history be damned! The teletype machine alarm sounded just as the game wrap-up was under way. That home run was not a home run; it was but an out of the ball park foul ball. Oops.....

Faces blushed. A few thoughts were unable to be aired. Then came that famous philosophical phrase so often quoted:

"Oh well"

The game went another six innings.
We worked late that night.

A footnote is in order. These have been a few memories that linger with humor; but at least ninety eight percent of recreated games went without incident, leaving no humor in their wake ...

"Oh well."

MAJOR LEAGUE BASEBALL FLAGSHIP STATIONS

*Denotes Spanish language flagship station

Team / Call Sign / Frequency

AMERICAN LEAGUE

Eastern Division

Baltimore Orioles WBAL-AM Baltimore, MD 1090 kHz
Boston Red Sox WEEI-AM Boston, MA 850 kHz
*WRCA-AM Boston, MA 1330 kHz
New York Yankees WABC-AM New York City, NY 770 kHz
*WADO-AM New York City, NY 1280 kHz
Tampa Bay Devil Rays WFLA-AM Tampa, FL 970 kHz
* -AM 760 kHz
Toronto Blue Jays CHUM-AM Toronto, Ontario Canada 1050 kHz

Central Division

Chicago White Sox WMVP-AM Chicago, IL 1000 kHz
Cleveland Indians WTAM-AM Cleveland, OH 1100 kHz
Detroit Tigers WXYT-AM Detroit, MI 1270 kHz
Kansas City Royals KMBZ-AM Kansas City, MO 980 kHz
Minnesota Twins WCCO-AM Minneapolis, MN 830 kHz

Western Division

Anaheim Angels KLAC-AM Los Angeles, CA 570 kHz
*XPRS-AM Tijuana, MX 1090 kHz
Oakland Athletics KABL-AM Oakland, CA 960 kHz
Seattle Mariners KIRO-AM Seattle, WA 710 kHz
Texas Rangers KRLD-AM Dallas, TX 1080 kHz

NATIONAL LEAGUE

Eastern Division

Atlanta Braves WSB-AM Atlanta, GA 760 kHz
*Spanish Network pending
Florida Marlins WQAM-AM Miami, FL 560 kHz
*WQBA-AM, Miami, FL 1140 kHz
Montreal Expos CKAC-AM Montreal, Quebec, Canada 730 kHz

New York Mets WFAN-AM New York City, NY 660 kHz

*WADO-AM New York City, NY 1280 kHz
Philadelphia Phillies WPHT-AM Philadelphia, PA 1210 kHz
*WSSJ-AM Philadelphia, PA 1310 kHz

Central Division

Chicago Cubs WGN-AM Chicago, IL 720 kHz
Cincinnati Reds WLW-AM Cincinnati, OH 700 kHz
Houston Astros KTRH-AM Houston, TX 740 kHz
*KRTX-AM Houston, TX 980 kHz
Milwaukee Brewers WTMJ-AM Milwaukee, WI 620 kHz
Pittsburgh Pirates KDKA-AM Pittsburgh, PA 1020 kHz
St. Louis Cardinals KMOX-AM St. Louis, MO 1120 kHz

Western Division

Arizona Diamondbacks KTAR-AM Phoenix, AZ 620 kHz
*KSUN-AM Phoenix, AZ 1400 kHz
Colorado Rockies KOA-AM Denver, CO 850 kHz
Los Angeles Dodgers KXTA-AM Los Angeles 1150 kHz
*KWKW-AM Los Angeles 1330 kHz
+ KYPA-AM Los Angeles 1230 kHz (Korean)
San Diego Padres KOGO-AM San Diego, CA 600 kHz
*KURS-AM San Diego, CA 1040 kHz
San Francisco Giants KNBR-AM San Francisco, CA 680 kHz
*KZSF-AM San Francisco, CA 1370 kHz

720 WGN Chicago, IL
730 CKAC Montreal, Quebec, Canada

740 KTRH Houston, TX
760 WSB Atlanta, GA
770 WABC, New York City, NY
830 WCCO, Minneapolis, MN

850 WEEI, Boston, A
850 KOA, Denver, CO
960 KABL Oakland, CA
970 WFLA Tampa, FL

980 KMBZ Kansas City, MO
980 KRTX Houston, TX (Spanish)
1000 WMVP Chicago, IL
1020 KDKA Pittsburgh, PA

1040 KURS San Diego, CA (Spanish)
1050 CHUM Toronto, Ontario, Canada
1080 KRLD Dallas, TX
1090 WBAL Baltimore, MD

1090 XPRS Tijuana, MX (Spanish)
1100 WTAM Cleveland, OH
1120 KMOX St. Louis, MO

1140 WQBA Miami, FL (Spanish)
1150 KXTA Los Angeles, CA
1210 WPHT Philadelphia, PA

1230 KYPA Los Angeles, CA (Korean)
1270 WXYT Detroit, MI

1280 WADO New York City, NY (Spanish)
1310 WSSJ Philadelphia, PA (Spanish)
1330 WRCA Boston, MA (Spanish)
1330 KWKW Los Angeles (Spanish)
1370 KZSF San Francisco, CA (Spanish)
1400 KSUN Phoenix, AZ (Spanish)

MLB FLAGSHIP STATIONS LISTED BY DIAL

POSITION (kHz)

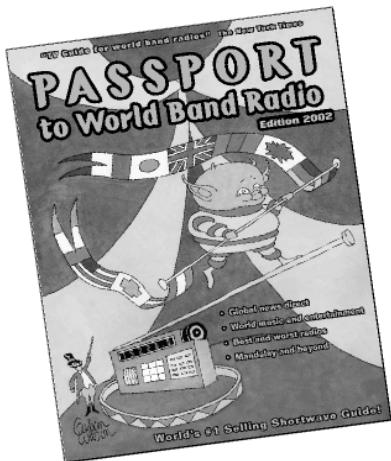
Frequency / Callsign / Location

560 WQAM Miami, FL
570 KLAC Los Angeles, CA
600 KOGO San Diego, CA
620 KTAR Phoenix, AZ
620 WTMJ Milwaukee, WI
660 WFAN New York City, NY
680 KNBR San Francisco, CA
700 WLW Cincinnati, OH
710 KIRO Seattle, WA

From Aerila to Kerbang, America has whiled away radio's first hundred years with the summer ritual of tuning in to baseball.) (Courtesy <http://members.aol.com/scottswim/> and Kerbang)



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The \$10 Multi-Purpose Mobile Antenna

It all started a few years ago when I noticed that FM reception in my car had deteriorated to the point that only the nearest powerhouse station could be received. It happens that mine is an older car (23 years old this month to be exact) which used an in-the-windshield folded dipole for an antenna. The connection, somewhere in the upper reaches of the dashboard between the lead-in and the radio, had finally given out. The solution was to trudge to Radio Shack seeking a replacement. What I bought was the "one-piece mini antenna" (RS#12-1334) for \$9.99 plus tax.

The problem with in-the-windshield antennas, aside from the fact that they were extremely directional, was that there was no mounting hole to put the \$10 replacement. Out came the drill and the largest bit I could find which would accommodate the antenna's swivel base. Now, I understand that this is not

a job for everyone. While I didn't hesitate to drill a hole in the surface of a car in bad need of a paint job, you might feel differently about your new Lexus or Suburban.

To mount the antenna I first examined the car to find an appropriate place to drill a hole. I chose the back of the right rear fender because I could easily access the installation from the rear window washer filler panel through which the 54" attached cable would be brought into the interior of the car. I found it wasn't enough to make the trip to the radio and that a 24" male-to-female extension (RS#12-1312) was required.

To start the drilling I first made a slight dimple in the metal surface with a nailset so the drill bit wouldn't wander around on the surface before biting into the metal. In my case, the slope of the surface was extreme (see photo) and the swivel of the base was just able to accommodate it. I finished the job with a generous amount of Coax-Seal to keep the installation waterproof.

◆ Great FM, What's Next?

I began to think about the antenna as I enjoyed my new-found FM reception. I was thinking about how important it was for the antenna to be vertical, to be outside the metal surface of the car and to be the right length for the frequencies I wanted to receive. I was musing about the fact that those were exactly the properties I would look for in, for example, a mobile scanner antenna.

The next day found me back at the Shack picking up a Motorola to BNC adaptor (RS#278-117) to outfit the Motorola plug from the FM antenna with a BNC plug to fit my hand held scanner. Sure enough, signals which were marginal at best with the scanner's rubber duck antenna inside the car came in quite well on the car FM antenna. As they say in the Radio Shack catalog: "Mobile use of scanners may be unlawful in some areas or may require a permit—check with local authorities." But, for ten bucks I now had an FM radio antenna and a "stealth" scanner antenna in one!

While I found that improved scanner reception was real plus for this antenna, I realized that a more permanent solution would

be to use a 3-way Motorola connector (RS#12-1313) which couples two radios to one antenna or vice versa. This way you could feed your FM car radio with one leg of the splitter and the scanner with the other. Not a bad setup for \$2 extra.

◆ The 2 Meter Gambit

The obvious next step was to think about this antenna in terms of amateur radio use. This could be the solution to the unsightly mag-mount with its trailing cable-across-the-trunk-or-roof problem. Clearly, using the FM antenna for transmitting would be more chancy. It's one thing to just receive signals, but transmitting brings in another set of requirements. What kind of Variable Standing Wave Ratio (VSWR) or amount of signal reflected back to the radio would be seen with this FM band car radio? What kind of power could be put through the unit without damaging the cable or the radio or the antenna?

Before I could conduct experimental transmissions I needed a 2 meter SWR/Power meter which could easily be used in a mobile (i.e. tight quarters) configuration. I found exactly what I needed in the MFJ catalog: the MFJ #844 Dual Band 144/440 MHz SWR/Wattmeter. Measuring about 3 inches square and about an inch thick, the 844 reads direct SWR and power in three ranges: 15, 60, and 200 watts. It seems perfect for hooking up to hand-holds which usually have under 10 watts output and most mobile/base units which typically have 40 to 50 watts out. If you use the FM antenna for transmitting, make certain you do not have the antenna coupler in line. You don't want to feed RF of any wattage into a radio or scanner.

The 844 is outfitted with SO-239 connectors to use as a bridge. You'll need a short piece of coax fitted with an SO-239 on one end and the proper transceiver antenna connector on the other. Some will use a BNC, others an SMA, and most higher wattage base/mobile transceivers use an SO-239 connector. For purposes of this test I used a series of adaptors to work down to the correct type of connector (see photo). For a permanent setup try to have as few adaptors as you can.



Take a deep breath and go ahead and drill a hole in your car. This mini FM car antenna from Radio Shack adapts to just about any slope.



The MFJ-844 SWR/Power meter can be used to check the SWR and the power output of your HT or mobile transceiver. Here, the mini antenna checks out at 1.2:1

With everything in place it was time to give the antenna the "smoke test." I tuned to an unused frequency on 2 meters. I keyed the mic with a certain amount of trepidation giving a proper ID and glancing at the SWR meter. It indicated 1.2:1, an excellent reading. I flipped the switch to indicate the power out and it correctly showed 10 watts. I used the meter on other factory designed and built 2 meter antennas to verify its proper operation. I also used the meter to check the power output of the transceiver I used in other antenna configurations. The MFJ-844 not only

readily available materials. Now, I'm considering rebuilding my 2 meter bicycle antenna!

◆ Last Word

I like the idea of using "off-the-shelf" products for slightly "off-the-mark" use. While the Radio Shack mini-antenna was not designed to be used as a scanner or 2 meter transmitting antenna I found it worked fine with a relative gain similar to that of a 1/4 wave mag-mount. I wouldn't feel comfortable putting more than 15 watts into the antenna. Besides, the antenna is not very efficient and

works well in the car, but can be used in a base station configuration with an insertion loss of less than 0.3dB.

Using a meter such as the 844 is perfect for the antenna experimenter. Like most hams, I'm always playing with antennas and the 2 meter/440 MHz band is a great place to play. The frequencies on these bands require small antennas which are easy to build with

I think that power output of more than that 15 watts would be wasted.

I found it worked fine for working repeaters in town, but it wasn't a great performer at large distances. If your 2 meter activities are mostly limited to in and around the local repeaters this little antenna will work fine. Since most of my 2 meter action is out of town, I'll keep my 5/8 wave antenna which will take the full 60 watts of my transceiver and gives a 3.4 dB gain over a 1/4 wave 2 meter antenna.

So, there you have it! Three antennas in one and all for \$10 in the Radio Shack mini-antenna. The MFJ-844 SWR/Power meter is widely available through most amateur radio mail order supply houses for \$70 or call MFJ Enterprises at 800-647-1800.

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Getting Started

Ask Bob

Bob Grove, W8JHD

bgrove@grove-ent.com

Q. Several questions about short-wave wire antennas:

(1) If I center-feed it at the apex of a "V" with both wires parallel to the ground, will it be directional?
(2) Do I need more than, say, 66 feet of wire?

(3) What is magical about 66 and 134 feet I've read so much about?
(4) Does plastic insulation on a wire affect reception? (Thomas Kline, email)

A. (1) Yes, depending on the lengths; the higher the frequency, the more directional toward the open ends.

(2) No, not with modern, high-sensitivity receivers. In most cases, 20-60 feet is plenty.
(3) Absolutely nothing for receiving shortwave signals. Those "magical" lengths provide the best impedance matching for 40 and 80/75 meter amateur radio transmitters when fed by coaxial cable.

(4) Absolutely not, although it can forestall corrosion. Besides weakening the wire, corrosion can add electrical resistance to the signal strength, as can very thin wire, and aluminum versus copper, but plastic insulation has virtually NO adverse effects on radio frequency energy at shortwave frequencies.

Q. I'm trying to find a pin-out diagram for a microprocessor chip used in Aiwa radios. Its four sides each have 16 pins, 64 total, and the printed legends are: 005HAL, IC 9318 FM, 046 Japan, and 297742. Can any of our readers help? Thanks. (Charles R. Stevens, Box 14 #26088, Concord, NH 03302-0014)

A. Let's ask them. I've included your mailing address so if anyone does have that pin-out he can send it.

Q. I have an Icom R75 receiver connected via a short length of coax to a metal window screen for an antenna, as suggested in a re-

cent article in MT. Do I also need a ground? (Tim M.)

A. Grounds are nowhere as important as they used to be for reception. They don't increase signal strengths, but in some cases they may reduce electrical noise interference and reduce the chance of electrical shock from faulty equipment. For the most part, the chassis/power supply interface acts as an adequate ground.

You can verify whether or not a ground will help reception by temporarily running a wire from the chassis ground screw to an earth ground pipe. It should be at least 8-ft. deep in moist, conductive soil, or it won't do anything. If you don't hear an improvement on various test frequencies, forget it.

By the way, there are other makeshift antennas you might try, such as connecting the antenna jack through a capacitor (virtually any value) to an unused telephone jack, bed springs, aluminum clotheslines, TV distribution cable, and even the round ground pin on an AC outlet! The capacitor is a voltage-blocking device to allow radio-frequency (RF) signals through without getting electrocuted or frying the radio. Use values in the .001-.1 microfarad range, and 600 working volts.

Q. I know that "UL Approved" stamped on products means that it meets standards of Underwriters Laboratories, but what does "CE" mean?

A. One of our astute readers, Phil Riba, forwarded this one. In the European Union, it's the "Conformité Européenne" (European Conformity) stamp ("CE") that endorses products sold in those member countries, while in Canada, it's CSA International, abbreviated "CSA."

Q. My house has aluminum siding, and my indoor Scantenna doesn't do well. Even a cellular mag-mount 3 dB gain antenna mounted on a cookie sheet doesn't work well for 860 MHz reception. Is the siding likely the culprit?

A. It sure is! That is an enormous reflective surface, and you need to get the antenna well

above it. Here are a couple possibilities to try:

(1) Put the Scantenna on a chimney mount for improved reception on all ranges, including 800 MHz.

(2) For 806-960 MHz only, select a UHF-TV antenna like a corner reflector or log periodic, and re-drill the U-bolt holes on the boom so that you can mount the elements vertically (90 degrees from the original horizontal pattern). Be sure to use coaxial cable, connecting to the antenna through a standard outdoor V/U TV balun transformer. The Grove Scanner Beam can also be used for its highly-directional gain at 800 MHz as well as other general-purpose VHF/UHF monitoring. Remember, though, that these are all beams, favoring a specific direction.

(3) You could also use your mobile cellular gain antenna on a pie plate for 800 MHz reception, or make it a little more professional and durable by substituting three or four three-inch metal rods, firmly attached to the antenna base. This will be omni-directional.

Q. With as much lightning as strikes each year, why have I never seen – nor heard of – lightning blasting a hole or burning a patch of grass where it strikes? (Mark Burns, Terre Haute, IN)

A. In the vast majority of cases, lightning is either between clouds or between a cloud and the highest conductive feature above ground. However, on a beach for instance, lightning does, indeed, strike the sand. When this happens it fuses the sand into a coarse, tubular "glass" called a fulgurite. This happens less frequently overland because of the presence of trees, building, power lines, and other structures that are more likely to be hit. In wide-open areas, however, lightning does strike the ground; ask a golfer!

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bgrove@grove-ent.com. (Please include your name and address.) The current Ask Bob is now online at our website: www.grove-ent.com

Getting Started

Get out your highlight pen. Let's get going with more bright ideas.

46

A hot time for monitoring public safety agencies is July 3rd and 4th. Since the fourth is on a Wednesday this year, the entire week should be good listening. But the best time is always from noon on the 3rd through midnight of the 4th. Find a hill or high rise parking structure to view the night fireworks, and for optimal monitoring range.

47

Is there an airshow in your plans? Check these websites.
<http://www.airforce.com/thunderbirds/>
<http://www.airshows.org/schedules.htm>

48

July is vacation time for many. Two things I always take are the camera and a scanner. Preprogram your scanner with the correct traveling frequencies. I find that photography works well with the scanning hobby. Occasionally I happen upon a big accident or storm condition that is made memorable with a photo I took at just the right moment. While driving through Montana last summer, I came upon a 40-acre forest fire that was right beside the Interstate. I have vivid memories of the helicopter dropping water etc. but nothing is better than a photo to show the guys back home. I always find police and fire vehicles worthy of a snapshot or two. Antenna towers are also a favorite. If nothing else, get out and buy one of those one-time disposable cameras.

49

Chances are you will travel within driving distance of a retail store that sells radios. Here are some reasons you should pay them a visit. They stock many radios, both scanners and ham transceivers. They have antennas galore. They have the time to answer your questions. You get to feel the merchandise before you reach for your wallet. Coax, power supplies, frequency directories, and things you never even thought of till you see it on the display shelf jump out and say you gotta have one of these! Check out HRO, AES, and the independents. You can find their addresses on the web.

50

If you get a new or almost new radio with the box, etc., be sure to keep ALL the materials, including the receipt. You may decide to return the radio or sell it. If I buy a radio with an instruction manual, I secure the manual in a ziplock baggie to protect it. I make and keep photocopies of the manuals for all my radios in a large centralized binder. If you need an instruction manual for your ham transceiver there is a publication called "Lost Manuals" that's well worth the \$20. <http://www.artscipub.com/shopping/pricelist.asp?prid=520>

If it is a Radio Shack scanner, check their website. <http://www.radioshack.com/ProductSupport/ProductSupportDrillDown.asp?OID=RSSupport-Communications#>

You can contact other manufacturers for a new manual. Sorry, but they charge for it! Sometimes you can just figure it out; but the newer radios tend to be more complicated.

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In past columns, I have offered to email the questions and correct answers for those wishing to study for their technician level, U.S. amateur ham license. I have reviewed my material and corrected a small mistake. (Like leaving out a graphic.) I now include a three-page study guide. I taught a class to the Spokane, Washington, Search and Rescue group. They now have 10 new hams. They have switched from the old 155.160 SAR frequency to ham repeaters for most operations. Let me know if you wish the materials via email.

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Those of us with handheld scanners go through quite a few batteries. I have found that I can sometimes get a few final cycles on rechargeable batteries if I leave them overnight in the charger. But no more than that, or the result could be a fire. Alkaline and various other batteries contain caustic and dangerous chemicals. I think it is a very bright idea to properly dispose of old batteries. Not in the dumpster or weekly garage, but to a recycling center. Some Radio Shack stores will accept them; you can also call or check the web for a recycling center near you. Try 1-800-822-8837 or <http://www.rbrc.org>.

Bright Ideas

Gary Webbenhurst

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Do you use special outdoor antennas for field day, emergencies or camping trips? Purchase a small duffel bag/sports bag for the small parts. Use plastic ziplock freezer baggies for loose screws, etc. I even included a screwdriver and other tools with the parts. Most important, use the color-coded labels to mark your antenna elements. (Works well for tent poles, too.). Include some light rope or cord to get your antenna up into a tree or other high location.

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Summertime is also good for checking out garage sales and ham swaps. If you get a "preowned" antenna, take an alcohol prep and a toothpick or cotton swab to clean up the inside of the BNC male connection. In fact, you should also clean your radio's female BNC connection right now! Look at the pins on the inside of the female connection. If necessary, you can use a needle to gently push the pins towards the center to insure a proper connection. As your collection of antennas grows, you can mark them with the colored labels!

A word of warning: constantly switching different antennas on and off your radio can be hazardous to the health of your BNC connection. Use great and tender care when removing and replacing your antenna.

I enjoy the privilege of writing this column. I hope you have found at least a few of my ideas helpful. I am always happy to hear from you, the faithful readers of *MT*.

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Robert Wyman

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Scanning for Wireless Microphones

Welcome back to the new Scanning Report column! Last month, I asked all the business travelers, government agents and other "connected" hobbyists to share their stories and suggestions. If you send me a bio and short narrative about your work and your radios, you may be featured in the "Who's Listening?" segment of this column. Send along a picture with it, and publication is almost guaranteed.

Let's start immediately by showcasing Chris Parris, a long-time hobbyist, *MT* subscriber and world-traveler!

◆ Who's Listening?

Chris Parris has a job that many will envy: he gets paid to play with communication systems as a broadcast engineer.

Chris first became interested in radio monitoring back in 1973, when his dad started taking flying lessons. Chris went along on some flights and soon wanted to listen-in at home if it was possible. A birthday gift solved the problem: a tunable, multi-band radio allowed him to sample the 118-136 MHz VHF aircraft band, although it was simply called "AIR" on the radio dial.

One night, when aircraft traffic was light and the AIR band was quiet, Chris explored the other bands on the tuning dial. He discovered the local police department on a VHF (simplex) channel. "After that, I was hooked," Chris told me. The police later switched to a multi-channel UHF repeater system, and Chris switched to a Radio Shack "Patrolman 4" UHF, crystal-controlled, four-channel scanner. "Things were great until I started realizing that other agencies were out there...and that I wasn't listening to them."

By the end of high school, the roof of his home and his car were covered with antennas, and he continued to search for the best scanners that he could afford. "I think I've purchased every 'breakthrough' radio over the years. Regency, Uniden, Radio Shack, Icom, OptoElectronics, AOR, and many others," Chris added.

His interests in radios and electronics steered him toward the television broadcast industry, where he currently serves as a remote broadcast engineer for Mira Mobile Television, a remote TV production vendor based in Portland, Oregon.

Chris is responsible for the television production trucks, satellite trucks and communication systems seen at many major sporting events, political conventions, live television shows and TV network events.

Chris has traveled extensively throughout the United States and the world. "Scanners have accompanied me on most of my journeys...I always travel with a couple of scanners in my briefcase, and try to find time to punch in a few frequencies of local interest."

During long airport layovers, Chris passes time – and adjusts his travel schedule – by listening in. "Nothing beats the times when I have been able to hear radio transmissions concerning the flight I'm waiting to board, alerting me to weather or air traffic delays, and having the satisfaction of knowing what's going on behind the scenes."

As a broadcast engineer, Chris has a commanding knowledge of frequency allocations and licensees. From local police and fire agencies to the most obscure wireless microphone channel, Chris can find interesting frequencies in every city he visits.

"My favorite monitoring targets vary...when I'm in an area with an active military presence, MilCom is at the top of the list. In metropolitan areas where trunking systems abound, they are the favorite flavor of the day. I

always try to keep an ear on federal frequencies wherever I go, as you can never tell what you might hear."

Chris enjoys sharing his travel and monitoring adventures by contributing to *MT* and participating in several Internet mailing lists. He still looks for those "breakthrough" radios as new models are introduced each year, and he also has a growing collection of scanner-control software for his newer units.

So, the next time you see a televised game of basketball, football, or baseball, or maybe a live TV network show west of the Rockies, look in the show's credits for a member of our monitoring family: Chris Parris, radio professional and radio hobbyist.

◆ Bank Number One

Is this a new financial institution? No, it's the segment of the column where new and exciting frequencies are listed. Try 'em out in bank #1 of your scanner and see if you get any hits in your area. Chris Parris sends along this extensive list of broadcast wireless microphone channels. Be honest: how many of you know that a wireless microphone band exists just below the 800 MHz band?

These channels may be heard at sporting events, movie filming locations and other venues. I personally heard a few of them at a televised golf tournament, where they were set up as "crowd mics" along the fairways. Older scanners can usually receive the portion of these frequencies between 760 MHz and 806 MHz; newer scanners can probably get all the frequencies listed (Narrow FM mode). Note: Microphone companies sell their products worldwide, and since channel plans vary in some countries, every frequency listed will not be available for use in every country.

When used at a local event, wireless microphone channels are selected so not to interfere with local UHF TV channels, other wireless microphones, or other communication systems. They are used for "talent" microphones (announcers, reporters and guests), crowd microphones and production communications. Each manufacturer has its own channel numbering plan, and some frequencies appear in multiple channel plans. Sennheiser and Sony products are listed below; to avoid confusion, only the frequencies and manufac-



When traveling, Chris takes with him a Yupiteru MVT-7100, Alinco DJ-X10, Radio Shack PRO-94, Yaesu VX-IR, Mayfair AR-108, Optoelectronics Optocom and a Toshiba Libretto to run the Opto radio. And yes, his briefcase is heavy!

turer names are listed (not the manufacturer's channel numbers).

As a footnote to Chris' comments and for the younger hobbyists and radio historians – tunable radios with separate dials for the AM broadcast band, FM broadcast band, "Short-wave" band, VHF Aircraft band, and VHF/UHF "Public Safety" bands preceded the scanning radios we enjoy today. Most of the multi-band radios were large, bulky and heavy. Analog dials, tuning knobs and band selector switches allowed the listener to choose one band and one channel to monitor. There were no internal

memories, digital displays or signal-capturing circuits.

In fact, most of the linear display windows also had a secondary identification marking called "LOG." This was a ruler of sorts, with graduations running from 0 to 10. Since listeners could not identify the exact frequency being heard, the LOG was used to note where the dial-pointer was located within the window. The purpose? To allow the user to go back to that same frequency at a later date. Imagine telling your friends that you heard the police at (LOG) 9-1/2 on the dial!

◆ On the Keyboard

You guessed it! Here's the "teaser" for next month's column. We're going to spotlight a hobbyist who has flown with the U.S. Customs Air Branch and currently interprets aerial photographs for the legal community. We'll also look at some special event frequencies and local systems.

Remember to send your information to me at the e-mail address listed above.

Table 1: Wireless Microphone Frequencies

519.600 Sennheiser	750.400 Sony	765.600 Sony	774.625 Sony	781.200 Sony	790.500 Sony	800.250 Sony
520.525 Sennheiser	750.600 Sony	765.800 Sony	774.750 Sony	781.250 Sony	790.625 Sony	800.375 Sony
521.550 Sennheiser	750.700 Sennheiser	766.000 Sony	774.800 Sony	781.375 Sony	790.750 Sony	800.500 "Sennheiser, Sony"
522.725 Sennheiser	750.800 Sony	766.200 Sony	774.875 Sony	781.400 Sony	790.875 Sony	800.625 Sony
523.125 Sennheiser	751.000 Sony	766.400 Sony	775.000 Sony	781.500 Sony	791.000 Sony	800.750 Sony
525.175 Sennheiser	751.200 Sony	766.600 Sony	775.125 Sony	781.600 Sony	791.125 Sony	800.875 Sony
526.450 Sennheiser	751.400 Sony	766.800 Sony	775.200 Sony	781.625 Sony	791.250 Sony	801.000 "Sennheiser, Sony"
529.475 Sennheiser	751.600 Sony	767.000 Sony	775.250 Sony	781.750 Sony	791.375 Sony	801.125 Sony
534.750 Sennheiser	751.800 Sony	767.200 Sony	775.375 Sony	781.800 Sony	791.500 Sony	801.250 Sony
536.500 Sennheiser	752.000 Sony	767.400 Sony	775.400 Sony	781.875 Sony	791.625 Sony	801.375 Sony
537.100 Sennheiser	752.200 Sony	767.600 Sony	775.500 Sony	782.000 Sony	791.750 Sony	801.500 Sony
539.925 Sennheiser	752.400 Sony	767.800 Sony	775.600 Sony	782.125 Sony	791.875 Sony	801.600 Sennheiser
541.300 Sennheiser	752.600 Sony	768.000 Sony	775.625 Sony	782.250 Sony	792.000 Sony	801.625 Sony
543.150 Sennheiser	752.800 Sony	768.200 Sony	775.750 Sony	782.375 Sony	792.125 Sony	801.750 Sony
548.625 Sennheiser	753.000 Sony	768.400 "Sennheiser, Sony"	775.800 Sony	782.500 Sony	792.250 Sony	801.875 Sony
549.325 Sennheiser	753.200 "Sennheiser, Sony"	768.600 Sony	775.875 Sony	782.625 Sony	792.375 Sony	802.000 Sony
630.300 Sennheiser	753.400 Sony	768.800 Sony	776.000 Sony	782.750 Sony	792.500 Sony	802.125 Sony
631.500 Sennheiser	753.600 Sony	769.000 Sony	776.125 Sony	782.875 Sony	792.625 Sony	802.250 Sony
632.400 Sennheiser	753.800 Sony	769.200 Sony	776.200 Sony	783.000 Sony	792.750 Sony	802.300 Sennheiser
632.850 Sennheiser	754.000 Sony	769.400 Sony	776.250 Sony	783.125 Sony	792.875 Sony	802.375 Sony
634.350 Sennheiser	754.200 Sony	769.600 Sony	776.375 Sony	783.250 Sony	793.000 Sony	802.500 Sony
635.100 Sennheiser	754.400 Sony	769.800 Sony	776.400 Sony	783.375 Sony	793.125 Sony	802.625 Sony
636.150 Sennheiser	754.600 Sony	770.000 Sony	776.500 Sony	783.500 Sony	793.250 Sony	802.750 Sony
636.750 Sennheiser	754.800 Sony	770.125 Sony	776.600 Sony	783.625 Sony	793.375 Sony	802.875 Sony
637.250 Sennheiser	755.000 Sony	770.200 Sony	776.625 Sony	783.750 Sony	793.500 Sony	803.000 Sony
641.200 Sennheiser	755.200 Sony	770.250 Sony	776.750 Sony	783.875 Sony	793.625 Sony	803.125 Sony
644.150 Sennheiser	755.400 Sony	770.375 Sony	776.800 Sony	784.000 Sony	793.750 Sony	803.250 Sony
647.200 Sennheiser	755.600 Sony	770.400 Sony	776.875 Sony	784.125 Sony	793.875 Sony	803.300 Sennheiser
651.350 Sennheiser	755.800 Sony	770.500 Sony	777.000 Sony	784.250 Sony	794.125 Sony	803.375 Sony
654.750 Sennheiser	756.000 Sony	770.600 Sony	777.125 Sony	784.375 Sony	794.250 Sony	803.500 Sony
657.900 Sennheiser	756.200 Sony	770.625 Sony	777.200 Sony	784.500 Sony	794.375 Sony	803.625 Sony
661.400 Sennheiser	756.400 Sony	770.750 Sony	777.250 Sony	784.625 Sony	794.500 Sony	803.750 Sony
674.125 Sennheiser	756.600 Sony	770.800 Sony	777.375 Sony	784.750 Sony	794.625 Sony	803.875 Sony
675.000 Sennheiser	756.800 Sony	770.875 Sony	777.400 Sony	784.875 Sony	794.750 Sony	804.000 Sony
677.575 Sennheiser	757.000 Sony	771.000 Sony	777.500 Sony	785.000 Sony	794.875 Sony	804.125 Sony
679.875 Sennheiser	757.200 Sony	771.125 Sony	777.600 Sony	785.125 Sony	795.000 Sony	804.250 Sony
680.500 Sennheiser	757.400 Sony	771.200 Sony	777.625 Sony	785.250 Sony	795.125 Sony	804.375 Sony
682.650 Sennheiser	757.600 "Sennheiser, Sony"	771.250 Sony	777.750 Sony	785.375 Sony	795.250 Sony	804.500 Sony
683.775 Sennheiser	757.800 Sony	771.375 Sony	777.800 Sony	785.500 Sony	795.375 Sony	804.625 Sony
684.250 Sennheiser	758.000 Sony	771.400 Sony	777.875 Sony	785.625 Sony	795.500 Sony	804.750 Sony
692.200 Sennheiser	758.200 Sony	771.500 Sony	778.000 Sony	785.750 Sony	795.625 Sony	804.875 Sony
692.700 Sennheiser	758.400 Sony	771.600 Sony	778.125 Sony	785.875 Sony	795.750 Sony	805.000 Sony
693.600 Sennheiser	758.600 Sony	771.625 Sony	778.200 Sony	786.000 Sony	796.000 Sony	805.125 Sony
694.200 Sennheiser	758.800 Sony	771.750 Sony	778.250 Sony	786.125 Sony	796.000 Sony	805.250 Sony
695.200 Sennheiser	759.000 Sony	771.800 Sony	778.375 Sony	786.250 Sony	796.125 Sony	805.375 Sony
696.400 Sennheiser	759.200 Sony	771.875 Sony	778.400 Sony	786.375 Sony	796.250 Sony	805.400 Sennheiser
697.100 Sennheiser	759.400 Sony	772.000 Sony	778.500 Sony	786.500 Sony	796.375 Sony	805.500 Sony
697.500 Sennheiser	759.600 Sony	772.125 Sony	778.600 Sony	786.625 Sony	796.500 Sony	805.625 Sony
740.100 Sennheiser	759.800 Sony	772.200 Sony	778.625 Sony	786.750 Sony	796.625 Sony	805.750 Sony
740.600 Sennheiser	759.900 Sennheiser	772.250 Sony	778.750 Sony	786.875 Sony	796.750 Sony	805.875 Sony
741.200 Sennheiser	760.000 Sony	772.375 Sony	778.800 Sony	787.000 Sony	796.875 Sony	805.975 Sony
741.900 Sennheiser	760.200 Sony	772.400 Sony	778.875 Sony	787.125 Sony	797.000 Sony	806.400 Sennheiser
742.700 Sennheiser	760.400 Sony	772.500 Sony	778.875 Sony	787.250 Sony	797.125 Sony	811.400 Sennheiser
743.600 Sennheiser	760.600 Sony	772.600 Sony	779.000 Sony	787.375 Sony	797.250 Sony	812.400 Sennheiser
744.600 Sennheiser	760.800 Sony	772.625 Sony	779.125 Sony	787.375 Sony	797.375 Sony	813.600 Sennheiser
745.800 Sennheiser	761.000 Sony	772.750 Sony	779.200 Sony	787.500 Sony	797.500 Sony	816.100 Sennheiser
746.600 Sony	761.200 Sony	772.800 Sony	779.250 Sony	787.625 Sony	797.625 Sony	816.900 Sennheiser
746.200 Sony	761.400 Sony	772.875 Sony	779.375 Sony	787.750 Sony	797.750 Sony	819.600 Sennheiser
746.400 Sony	761.600 Sony	773.000 Sony	779.400 Sony	787.875 Sony	797.875 Sony	821.150 Sennheiser
746.600 Sony	761.800 Sony	773.125 Sony	779.500 Sony	788.125 Sony	798.000 Sony	821.600 Sennheiser
746.800 Sony	762.000 Sony	773.200 Sony	779.600 Sony	788.250 Sony	798.125 Sony	821.800 Sennheiser
747.000 Sony	762.200 Sony	773.250 Sony	779.625 Sony	788.375 Sony	798.125 Sony	838.100 Sennheiser
747.200 Sony	762.400 Sony	773.375 Sony	779.750 Sony	788.500 Sony	798.250 Sony	839.400 Sennheiser
747.400 "Sennheiser, Sony"	762.600 Sony	773.400 Sony	779.875 Sony	788.625 Sony	798.375 Sony	841.100 Sennheiser
747.600 Sony	762.800 Sony	773.500 Sony	780.000 Sony	788.750 Sony	798.500 Sony	849.100 Sennheiser
747.800 "Sennheiser, Sony"	763.000 Sony	773.600 Sony	780.125 Sony	788.875 Sony	798.625 Sony	854.100 Sennheiser
748.000 Sony	763.200 Sony	773.625 Sony	780.200 Sony	789.000 Sony	798.750 Sony	854.600 Sennheiser
748.200 Sony	763.400 Sony	773.750 Sony	780.250 Sony	789.125 Sony	798.875 Sony	855.300 Sennheiser
748.400 Sony	763.600 "Sennheiser, Sony"	773.800 Sony	780.375 Sony	789.250 Sony	799.000 Sony	856.200 Sennheiser
748.600 Sony	763.800 Sony	773.875 Sony	780.400 Sony	789.375 Sony	799.125 Sony	857.300 Sennheiser
748.800 Sony	764.000 Sony	774.000 Sony	780.500 Sony	789.500 Sony	799.250 Sony	859.700 Sennheiser
749.000 Sony	764.200 Sony	774.125 Sony	780.600 Sony	789.625 Sony	799.375 Sony	861.150 Sennheiser
749.200 Sony	764.400 Sony	774.200 Sony	780.625 Sony	789.750 Sony	799.500 Sony	861.600 Sennheiser
749.400 Sony	764.600 Sony	774.250 Sony	780.750 Sony	789.875 Sony	799.625 Sony	863.100 Sennheiser
749.600 Sony	764.800 Sony	774.375 Sony	780.800 Sony	790.000 Sony	799.750 Sony	863.900 Sennheiser
749.800 Sony	765.000 Sony	774.400 Sony	780.875 Sony	790.125 Sony	799.875 Sony	864.500 Sennheiser
750.000 Sony	765.200 Sony	774.500 Sony	781.000 Sony	790.250 Sony	800.100 Sennheiser	864.900 Sennheiser
750.200 Sony	765.400 Sony	774.600 Sony	781.125 Sony	790.375 Sony	800.125 Sennheiser	

The Military VHF/UHF Spectrum

Military communications activity can be found in the VHF-Low Band (30-50 MHz) in the following frequency ranges:

30.00-30.55	36.00-36.99
32.00-32.99	40.00-41.99
34.00-34.99	49.61-49.99

Military communications can also be found in the following government bands mixed in with various government agencies communications: 162.00-173.9875 and 406.00-420.00 MHz

VHF-High Band Bandplans

The primary military-only bands in the VHF high band are 138.00-144.00 and 148.00-150.775. Basic spacing between channel is 25 kHz (USN/USA). The Army uses 12.5 kHz spacing in their segments of the band. The primary communications mode is narrowband FM, but some AM is used by air units of the various services for tactical air-to-air comms.

Air Force

138.000-138.500	143.750-143.925
138.875-138.925	148.050-148.250
139.600-140.000	148.450-148.550
140.375-140.425	149.150-149.325
141.525-151.925	149.475-149.550
142.125-142.300	149.925-150.050
143.425-143.475	150.150-150.350

Navy

138.525-138.850	143.500-143.725
138.950-138.875	148.275-148.425
139.475-139.575	148.950-149.125
140.025-140.350	149.350-149.450
140.450-141.000	150.075-151.125
141.950-142.100	150.375-150.400
142.500-142.850	

UHF Military Aircraft Bandplan

The military has a BIG (175 MHz) military aircraft band in the 225-400 MHz range. Basic spacing between channels is 25 kHz. You will find not only oddball spacing (especially in segments of the band with military satellite uplink/downlink channels), but a variety of modes and bandwidths. The primary mode in this band is AM, but FM and digital modes are used extensively on satellite channels.

Some other federal agencies will be found within this frequency range, notably the Coast Guard, NASA, Federal Aviation Administration (FAA), and the Department of Energy (DOE). All agencies use 243.000 MHz. It is a worldwide emergency channel. Military satellite uplinks are in the 240-270 MHz range. For specific satellite downlink frequencies see *Satellite Times*, Vol 1, issues 4-6 and Vol 2 issue 1.

Air Force

225.000-226.275	259.000-261.200
227.300-227.350	261.400-262.575
227.800-229.275	263.200
233.400-233.650	264.600-264.975
234.600-235.225	265.400
235.500-236.150	266.000-266.600
236.500-237.150	267.800-267.850
238.200-239.200	268.000-268.175
239.400	268.750
239.650-240.800	269.900-270.200
243.300-243.750	270.400
251.000	271.000-271.350
251.175-251.275	271.800-272.150
251.800-253.000	273.400
253.375-253.700	273.500
254.200	274.400
254.400-254.800	275.000
255.500-256.150	275.800-276.200
256.300	276.400-276.975
256.600	277.600
257.075-257.525	278.200
258.000	278.400
258.125-258.575	278.600

279.400	344.000	328.100-328.500	360.900-361.300	390.800-390.900	398.850-398.950
279.700-280.150	344.600-344.900	336.200-336.500	361.800-362.200	397.850-397.950	399.400.
280.500	346.200	336.900-337.375	362.400-362.900		
281.600	347.000-347.400	337.800-337.150	363.300-363.750		
282.400-282.750	348.200-348.500	339.400-339.725	364.800-364.875		
283.250	348.800-349.700	340.200-340.500	369.900-369.950		
283.650-284.150	350.450	341.000-341.350	374.800-375.075		
284.800	350.900-351.600	342.600-342.900	376.800-376.900		
286.250-286.500	352.600-352.975	344.100-344.500	377.900		
286.675-287.800	354.200-354.575	345.000-345.200	380.400-380.950		
288.400-289.700	355.200	345.800-346.100	381.900-382.950		
290.600-291.150	357.000-357.200	346.500-346.900	383.400-383.800		
291.800-296.650	357.500	347.800-348.100	384.050-384.550		
296.800-298.800	358.200-358.450	349.800-350.125	385.000-385.350		
299.000	359.000-359.300	350.400-350.800	386.800-386.900		
300.600-300.925	359.800-360.075	352.100-352.550	387.400		
301.400-301.750	361.400-361.750	353.000-353.450	388.600		
302.400	363.800-364.700	354.600-356.250	390.275-390.625		
303.000-303.325	369.000-369.700	357.700-358.100	396.300-396.400		
303.800-304.000	371.000-371.800	358.600-358.950	398.525-398.750		
304.800-304.900	372.150-373.225	359.400-359.725	399.000.		
305.400-305.750	374.000	360.125-360.500			
306.400	375.100-376.200				
308.600-308.950	377.000				
309.400-309.600	377.550				
311.000-311.375	377.800-377.850				
313.600-313.650	378.000-379.000				
314.200-314.500	379.300-379.700				
315.000-315.250	381.000-381.175				
315.800-315.900	381.300				
316.200-316.450	383.000-383.375				
316.700-316.900	384.000				
317.850-318.400	384.600-384.900				
319.400-319.700	385.700-386.200				
320.000-320.200	387.200-387.225				
320.600-321.250	387.800				
321.350-321.400	388.100-388.500				
322.250	388.850-389.200				
322.600-322.950	389.800-390.200				
323.700-324.700	390.975-393.150				
325.500-326.400	394.200-395.100				
327.175-327.700	395.800-395.900				
327.900-328.075	396.000-396.200				
335.700-336.100	396.800-397.250				
336.600-336.800	397.800				
337.400-337.725	398.000-398.200				
338.400-339.400	398.500				
340.600-340.900	398.800				
341.400-342.500	399.800-399.975.				
343.000-343.550					
Navy					
233.700-233.975	281.700-281.075	256.300-256.950	307.800-307.900	229.800	293.350
235.250-235.475	282.900-283.500	257.400	309.200-317.800	230.500	300.250
236.200-236.450	284.200-284.550	258.700-256.900	319.800-319.950	235.850	301.750
237.825-238.175	284.900-285.375	259.700-258.100	321.300	240.500	304.000
249.875-250.950	285.700-286.200	263.000-263.150	322.300-322.550	246.950	307.300
251.350-251.750	289.800-290.100	267.900	323.000-323.250	252.500	322.750
253.050-253.350	290.050-290.100	269.000-269.600	327.000-327.150	256.300	324.000
253.750-254.175	291.200-291.500	270.250-270.350	327.800	257.500	326.000
254.850-255.550	299.300-299.775	272.700-272.750	335.500-335.650	258.800	327.500
263.200	300.200-300.550	273.450	338.200-338.350	259.450	336.800
265.600-266.550	301.000-301.375	273.550-273.600	339.800	266.050	337.550
266.600-267.975	301.800-302.100	276.300	343.600-343.950	267.200	337.850
267.300-267.575	303.400-303.750	277.400	346.250-346.400	268.750	343.350
267.600-267.850	304.100-304.250	278.300-278.325	348.600-348.750	270.500	349.500
268.300-268.950	305.000-305.300	278.450-278.550	350.200-350.350	273.800	344.900
268.675-269.175	305.800-306.175	278.300-278.325	351.700-352.050	274.000	345.500
269.400-269.700	306.450-306.800	278.450-278.550	353.500-354.150	274.200	350.500
269.800-270.200	306.400-307.850	279.500-279.650	357.600	274.700	352.850
270.400	279.800-279.950	281.400-281.550	360.600-360.850	274.700	352.850
271.000-271.350	308.100-308.500	282.100-282.300	362.300-362.350	280.050	355.400
271.800-272.150	309.000-309.350	282.100-282.300	363.000-363.250	283.250	356.200
273.400	309.700-310.950	284.600-284.750	369.900	284.200	357.000
273.500	311.400-313.500	285.400-285.650		288.550	357.550
274.400	312.700-313.125	286.600	370.850-370.950	292.800	358.450
275.000	314.700-314.975	287.850-288.350	371.850-372.100		
275.500-275.750	315.300-315.700	290.200-290.500	377.050-377.200		
276.300	317.700-317.175	291.600-291.750	379.100-379.250		
276.600	318.500-318.975	292.600	379.800-380.350		
277.300-277.300	319.200-320.500	298.850-298.950	381.200-381.650		
277.600	321.800-322.150	299.200	385.400-385.650		
278.200	323.300-323.500	306.200-306.300	387.000-387.150		
278.400	324.800-324.900	306.900-307.375	388.800		
278.600	326.500-326.950				

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US Navy/Marine Corps MARS Reorganizes

MARS stands for Military Affiliate Radio System. It is a military support radio group, with three branches serving active-duty personnel in the United States Army, the Air Force, and the Navy/Marine Corps. All members are radio amateurs who have volunteered to aid in national emergency preparedness, and in the handling of routine traffic such as "MarsGrams" and morale patches for personnel in the field.

With the coming of Internet and other modern communications, the routine traffic has greatly declined. The emergency mission, called NS/EP for National Security/Emergency Preparedness, has become more important. Meanwhile the Navy-Marine Corps MARS has entered the digital age by setting up a complete e-mail system for the US Coast Guard. Some, however, think that even these functions are no longer relevant, and that MARS has simply outlived its time.

As the service has evolved, or at least tried to evolve, it has made periodic attempts to cut duplication, better utilize resources, and increase interoperability. This latter buzzword is US government-speak for what is actually a desirable goal. It means that all the various groups of people with radios in the NS/EP mission should actually be able to talk to one another and to pass meaningful information.

In 1997, the Army and Air Force MARS reached total interoperability on all nets and circuits. They could check into other services' nets and pass traffic, using a systemwide message form with 16 lines. The Navy-Marine Corps MARS, however, only complied on a very limited basis, due to its lack of nationwide frequency allocations.

This stayed pretty much the status quo until April of 2001, when Navy-Marine Corps MARS command announced a full reorganization, which will take place over the next two or three years. Ultimately, Navy-Marine Corps MARS will have four regions instead of its current ten. These will divide work load more evenly. They will also correspond a little more closely with the regions used by the Federal Emergency Management Agency (FEMA). Mars and

FEMA participate in quarterly drills, as well as actual emergencies.

The new Region one, for the Northeast and Mid-Atlantic, will have its control station in Groton, Connecticut. Control for Region 2 (Southeast and Midwest) will be in Great Lakes, Illinois. Region 3 (South Texas and North Central US) will be in Oklahoma City, Oklahoma, and Region 4 (West and Hawaii) will be in San Diego, California.

In order to implement the changes quickly, they are being issued in MARS bulletins called Advance Change Notices. These are transmitted on various bands and modes, and are also sometimes available on Web sites. At some point we'll probably see a new frequency plan for the Navy-Marine Corps MARS, but it has not been issued at press time.

Almost immediately, one of these notices rewrote "Annex J" of the regulations to allow full interoperability with the other two branches. Stations in the other two services can now enter Navy-Marine Corps nets and pass traffic, within their corresponding regions. In an emergency, anyone can talk to anyone. Not affected, though, are the remaining phone patches, as these use a separate authorization.

◆ Scratch Incirlik, Welcome Sigonella

On May first, the US Air Force Global High Frequency (GHFS) station at Incirlik Air Base in Turkey left the air. It was immediately replaced by a new one at Sigonella Air Base in Italy.

Sigonella's times and frequencies are different from Incirlik's. They are on 4709 kilohertz (kHz) upper sideband (USB) from 1600 to 0400 Coordinated Universal Time (UTC). They also use 6724, 9007, and 11271 kHz, for all 24 hours, and 15038 kHz from 0400 to 1600. This schedule is the same in winter and summer.

Some of these new Sigonella frequencies are also used by Canadian Forces. This may be an attempt to improve interoperability in joint operations. Jeff Haverlah, a listener in Texas, has already heard coded military

The Navy-Marine Corps MARS has just begun a major reorganization to make it the last MARS command to achieve total interoperability. The plan will convert the current ten regions into four.

broadcasts on the new Sigonella channels, as well as on the new Lajes frequencies of 9025 and 11181.

◆ RTTY Harmonics

Every so often, one will encounter a radioteletype (RTTY) signal with very strange characteristics, such as a shift that can be measured in kilohertz instead of hertz. These huge shifts are generally a result of hearing a harmonic of the frequency-shift-keyed fundamental. For example, the second harmonic of an 850-Hz shift signal is shifted 1700 hertz, and the third harmonic by a boggling 2.55 kHz!

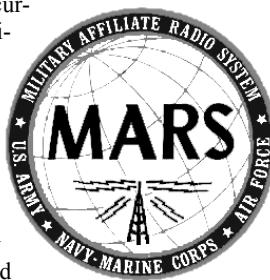
Just to add some more confusion, the channel offset, or the difference between the frequency shown by your radio and the authorized channel center, will also grow in the same manner. However, the speed stays the same. This means it's often possible to decode and identify these harmonic signals, if one's equipment and software are up to it. One can also, of course, divide the shift until coming up with a common value such as 850 and 170 hertz, then hunt for something that sounds the same when conditions permit on the lower frequencies.

Day Watson, a listener in the UK as well as a mainstay on the Internet's Worldwide Utility News mailing list, found an excellent example. He picked up MGJ, the British Royal Navy in Faslane, England, on 10168.7 at 75 baud. Only the mark tone was audible, as this was apparently a spurious harmonic affecting the two RTTY tones differently. Watson was able to decode it treating the mark as an on-off keyed signal.

Later, though, at 1927, the space tone finally turned up. It was also by itself, but exactly 2.55 kHz lower. Bingo. This was similarly decoded by on-off keying, and this MGJ signal was thus identified as the third harmonic of 3390 kHz.

A similar technique has been used to snare the culprits when HF surface radars turn up in places where they really should not be. An unusually wide sweep range on one of these should be investigated for subharmonics that might be the true signal.

That's dizzy enough for one month. See you!



Hugh Stegman

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ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
CW	Continuous Wave (Morse telegraphy)
DEA	Drug Enforcement Administration
DX	Distant Transmitter
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
GHFS	Global High Frequency System
M21	Russian CW time-stamped coded datagrams
M22	4XZ, Israeli encrypted CW
MARS	Military Affiliate Radio System
Meteo	Meteorological (weather office)
MFA	Ministry of Foreign Affairs
Pactor	Packet Teleprinting Over Radio
RAF	Royal Air Force
RSA	Republic of South Africa
RTTY	Radio Teletype
SITOR-A	Simplex Telex Over Radio, ARQ mode
SITOR-B	Simplex Telex Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
USS	United States Ship

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

68.0	GBY20-Royal Navy Submarine Command, UK, with an RTTY exercise broadcast for Swedish Navy, Ostergotland, at 0800. (Day Watson-UK)
81.0	GYN2- Royal Navy Submarine Command, UK, with an RTTY exercise broadcast for Swedish Navy, Ostergotland, at 0809. (Watson-UK)
2829.5	SPB28-Szczecin Radio, Poland, telling a ship to "type or quit please," in SITOR-A, at 2045. (Watson-UK)
3690.0	RBV70-Tashkent Meteo, Uzbekistan, with FAX weather charts (60/576), at 2312. (Ary Boender-Netherlands)
4015.0	Unid-Probably Russian Air Defense "Time Stamp Station" (M21), with strange CW messages like 990306??0?????, at 2306. (Boender-Netherlands) These are unknown observations or instrument readings in a peculiar, one-line format. Times like the "0306" are local somewhere in Russia, and the ? is a place holder for a missing item. -Hugh
4015.5	AE1USA-US Air Force MARS, working AEM1WF in Pactor, at 1914. (Boender-Netherlands)
4610.0	GYA-Royal Navy, Northwood, UK, with new FAX service, parallel on 11086.5, at 1125. (Watson-UK)
5696.0	CAMSLANT-US Coast Guard, Pt. Reyes, CA, advising helicopter Coast Guard 6031 on the status of a crash victim, at 0001. (Ron Perron-MD) Rescue 2135-US Coast Guard aircraft with ops-normal report for CAMSLANT, at 0557. (Mid-Atlantic Dxer-MD)
6628.0	Iberia 6650-Airliner with a position report for Santa Maria, at 0721. (Brent Davenport-CO)
6694.0	T78F-Canadian Forces, in a patch via Halifax Military to Rescue Coordination Center Halifax, reporting completion of flare training, at 0043. (Ron Perron-MD)
6697.0	Mama Bear-US Strategic Command, with an EAM echoed from the GHFS stations, simulcast on 8992, 11244, and 13907, at 0207. (Jeff Haverlah-TX)
6739.0	Andrews-US Air Force GHFS station at Andrews AFB, MD, with a 20 character EAM, immediately echoed by Hickam AFB, HI, at 0528. (Davenport-CO)
6897.0	Cape Radio-US Air Force Eastern Test Range, working King 1, USS Underwood, Cape Osbourne, and others, for a space shuttle launch, at 1738. (Allan Stern-FL)
7753.0	322-Moroccan military, calling 222 in ALE, at 2102. (Boender-Netherlands)
7813.0	DP2-Moroccan Army, calling GLOBHO ZYM in ALE, at 1955. O2-Moroccan Army, ALE calls to D1 at 2102 and 2105, then K2 at 2112. (Boender-Netherlands)
7845.0	Bangkok Radio, testing in RTTY and with messages to many Russian sounding addresses, at 1820. Unid-Spanish speakers using voice to set up RTTY, then sending a test tape ("cinta de pruebas"), at 1830. (Watson-UK)
7903.5	BA1-US Federal Bureau of Investigation, Baltimore, MD, working QT1, FBI, Quantico, MD, in ALE at 2104. (MADX-MD)
7966.0	2222-Moroccan military, calling 3333 in ALE, at 0406. (Boender-Netherlands)
7969.0	HR- Sonatrach Oil Company, Algeria, sounding at 0221, then RNS at 0243, ALG (Algiers) at 0305 and 0403, and GT at 0445. (MADX-MD)
7981.4	KZN 508-Sail Mail, Rockhill, with CW identifier and a special PACTOR mode, at 0237. (MADX-MD)
8040.0	GYA- Royal Navy, Northwood, UK., adding this frequency to the new FAX service along with 4610 and 11086.5, at 1143. GYA, with schedule changes at 1436. (Watson-UK)
8047.0	LAT-US National Guard, Latham, NY, sounding in ALE at 1854. (MADX-MD)
8188.0	9MR-Royal Malaysian Navy, Johor Baharu, with "unclass" (unclassified) RTTY traffic in English and Malay, to "all RMN ships," at 1923. (Watson-UK)
8298.0	VTP-India Navy, Vishakhapatnam, with encrypted RTTY traffic to "W-U-K" and others, at 1749. (Bob Hall-RSA)
8334.0	2222-Moroccan military, calling 3333 in ALE, at 0403. (Boender-Netherlands)
8335.0	Unid-Two males in the usual rather "salty" fishing boat chatter, both with New England accents, at 0025. (Perron-MD)
8397.0	UHCO-Russian Vessel Pionier Sedevodwinska, working Arkhangelsk in SITOR-A, at 1556. (Watson-UK)
8499.8	VTH- India Navy, Mumbai, with encrypted RTTY traffic to "X-I-E" and others, at 1746. (Hall-RSA)
8530.0	IAR-Rome Radio, Italy, with CW navigational warnings at 2043. (Boender-Netherlands)
8686.0	IRM-CIRM, International Radio Medical Center, Italy, accepting free medical and position plot traffic, with a CW marker at 2036. (Boender-Netherlands)
8875.0	O2-Moroccan Army, calling D1 in ALE at 2047. (Boender-Netherlands)
8906.0	Air France 671-Airliner with a position report for New York, at 0629. (Davenport-CO)
8992.0	533-Unknown US military aircraft, asking US Air Force McClellan Global for a "selcall" [Civil aero Selective Calling tones, not used on GHFS -Hugh]. The confused Global operator said she was sorry but McClellan did not have a "cell phone," after which 533 thanked her and was gone, at 0730. (Donald Storck-MI) Reach 5106-US Air force C-17, enroute from Guam to Hickam AFB, HI, with the freed EP-3 crew back from China, patching the US Defense Department via Hickam, then sent to 11181 kHz (Zulu-200), at 1406. (Cliff Watts-TX)
9016.0	Iron Fist-US Strategic Command, with EAM simulcast on 8992 and 11244, at 0105. (Haverlah-TX)
9031.0	Ascot 3201-Royal Air Force, UK, transport on the weekly shuttle to the Falkland Islands, working RAF Brize Norton at 0006. (Perron-MD)
9044.0	RIW-Russian Navy. Calling RJF94 in CW, at 2117. (Boender-Netherlands)
9045.0	5YE-Nairobi Meteo, Kenya, with FAX weather charts (180/576), at 1914. (Boender-Netherlands)
9150.0	RCH73-Tashkent Meteo, Uzbek, with FAX weather charts (60/576), at 1543. (Boender-Netherlands)

9164.0	Unid-Probably Russian Air Defense "Time Stamp Station" (M21), with CW messages like 99?2255?9?????, at 1855. (Boender-Netherlands)	14550.0	123-Moroccan military, calling C6C in ALE, at 1619. (Boender-Netherlands)
9165.0	HLL2-Seoul Meteo, Korea, with FAX weather charts at 1903. (Boender-Netherlands)	15088.0	CAMSPAC-US Coast Guard, Pt. Reyes, CA, working C-130 Coast Guard 1790 who is tracking a possible drug-running vessel, with the shore operator apparently in touch with the anti-drug task force over landline or another channel, at 0018. (Perron-MD)
9340.0	RCH72-Tashkent Meteo, Uzbek, with FAX charts (60/676), at 1432. (Boender-Netherlands)	15633.5	HMF26-Korean Central News Agency, Pyongyang, with English-language news, in RTTY (250/50), at 1044. (Hall-RSA)
9371.0	222-Moroccan Army, sounding in ALE at 1746. (Boender-Netherlands)	15962.0	Unknown, possibly Windmill from 13907, working unheard station that was possibly Good News, on Zulu-250 frequency, at 1841. (Haverlah-TX)
10033.0	Arrow 44A-Aircraft telling Miami Radio of departure from Caracas, Venezuela, enroute to Quito, Ecuador, at 2339. (Perron-MD)	16014.2	RFVIC-French Navy, with ARQ traffic, in French, to RFVITT (Detmar Mayotte) and RFQPT (Djibouti), at 1245. (Hall-RSA)
10204.0	Race Car-US Strategic Command, working Slow Ball, at 0213. Listerine, with an EAM simulcast on 8992 and 11244, at 1436, then working Slow Ball at 1511. (Haverlah-TX)	16035.0	JJC-Tokyo Radio, with Japanese newspaper FAX, 60/576, parallel on 17069.6, at 1618. (Boender-Netherlands)
11039.0	DDH9-Hamburg Meteo, Germany, with RTTY weather in German, then markers giving their other frequencies as 143.7, 11039.0, and 14467.3 kHz, at 1303. (Watson-UK)	16800.0	Unid-Station with relay of English-language Philippines News Agency stories, in SITOR-B, at 1638. (Hall-RSA)
11122.0	9MR-Malaysia Navy, with RTTY at 1624. (Hall-RSA)	16816.0	ZSC-Capetown Radio, RSA, with SITOR-B weather bulletins, parallel on 4214, 8428, and 12601, at 0935. (Hall-RSA)
11130.0	Y301-Moroccan Army, calling Y3 in ALE, at 0442. (Boender-Netherlands)	16971.0	JJC-Tokyo Radio, with Japanese newspaper FAX, 60/576, at 1703. (Boender-Netherlands)
11157.0	S16-Swedish Consulate, St. Petersburg, Russia, sounding in ALE at 1556. (Watson-UK)	17020.0	UDK-Murmansk Radio, Russia, calling 4LS in 3rd-shift Cyrillic RTTY, then giving traffic list and sending a blind message to vessel UCTI, at 1300. (Watson-UK)
11175.0	Skier 91-US Air National Guard, working Hickam Global, HI, regarding status of medical equipment, at 0701. (Davenport-CO)	17430.0	9VF 209-Kyodo News, Singapore, with Japanese newspaper FAX at 1618. (Boender-Netherlands)
11181.0	Reach 5106-US Air Force, enroute from Guam to Hickam AFB, HI, with the freed EP-3 crew, working Hickam at 1423. (Watts-TX)	18012.0	Circus Vert-French Air Force headquarters, Villacoublay, working Cotam 2235 at 2033. (Perron-MD)
11205.0	Architect-Royal Air Force Flight Watch Center, UK, with airfield "color" observations, at 2331. (Perron-MD)	18220.0	JMH5-Tokyo Meteo, with a FAX weather chart, at 0913. (Hall-RSA)
11220.0	Unid-typical fishing boat types complaining about restrictions and unknown (to them) interference, which was only the US Air Force, that's all, at 2304. (Perron-MD)	18320.0	BRA-Slovakian MFA, calling unknown station in ALE, at 1844. (MADX-MD)
11240.0	O2-Moroccan Army, with ALE calls to V3 at 2113, K2 at 2114, and T5 at 2125. (Boender-Netherlands)	18650.0	Taipei Meteo, Taiwan, with a FAX weather chart at 1556. (Boender-Netherlands)
11247.0	Ascot 3201-Royal Air Force, UK, working Haven (RAF Flight Watch, Ascension Island), at 0010. (Perron-MD)	18666.0	SU1-Federal Bureau of Investigation, Salt Lake City, UT, sounding in ALE at 1834. (MADX-MD)
11271.0	Trenton Military-Canadian Forces aircraft enroute to Sigonella Naval Air Station, Italy, getting arrival weather and asking Trenton to forward their arrival time, at 0142. (Perron-MD) <i>Sigonella has since joined GHFS on this frequency. -Hugh</i>	19131.0	Atlas-US DEA contract facility, Iowa, working aircraft Flint 951 at 1220. (Perron-MD)
11466.0	ALG-Sonatrach Oil Company, Algiers, calling HMD in ALE at 1906. (Watson-UK)	19530.0	Probably US military weather bulletins, running a RTTY "quick brown fox" test loop, at 1620. (Hall-RSA)
12160.0	DP2- Moroccan Army, calling O1 in ALE, at 2033. (Boender-Netherlands)	20469.0	AMX-Melbourne Meteo, Australia, with a FAX weather chart at 0715. (Boender-Netherlands)
12478.0	UCNJ-Russian vessel Igor Grabar, working Arkhangelsk in SITOR-A, with weather observations at 1835. (Watson-UK)	20815.0	HBC88-International Red Cross, probably Geneva, Switzerland, with a PACTOR (200/200) sign off of "IFRCGV," at 1250. (Hall-RSA)
12710.5	PWZ33-Brazil Navy, repeating a no-traffic marker in RTTY (850/75), at 0637. (Hall-RSA)	20958.0	S12-Swedish Embassy, Bogota, Colombia, working S84, Washington DC Swedish Embassy, in 2400 baud phase-shift keying, then ALE signoff, at 2055. (MADX-MD)
12984.0	4XZ-Israeli Navy or Government, Haifa (M22), with traffic and then the usual markers, at 1457. (Watson-UK)	22408.5	UFL-Vladivostok Radio, Russia, working vessel UDUK, in 3rd-shift Cyrillic SITOR-A, at 0822. (Watson-UK)
13510.0	CHF-Canadian Forces, Halifax, with FAX weather charts at 1822, then RTTY weather observations at 1844. (Boender-Netherlands)	22447.0	FUV-French Navy Djibouti, sending RTTY markers with the routing indicator of RFQME, in RTTY at 1406. (Watson-UK)
13597.0	JMH4-Tokyo Meteo, with FAX weather charts at 1935. (Boender-Netherlands)	22583.0	FUX-French Navy, Le Port, working an unknown ship, giving the usual one-line traffic rogers, then back to marker as RFVIE, in RTTY at 1458. (Watson-UK)
13855.0	OXT-Copenhagen Meteo, with a FAX ice chart for "Disko Bay," at 1311. (Watson-UK)	23546.0	Russian vessel Apollo-1, working UIW, Kaliningrad Radio, in 3rd-shift Cyrillic RTTY at 2353. (MADX-MD)
13886.0	Moscow Meteo, with FAX weather charts at 0752. (Boender-Netherlands)	24332.0	GXQ-Royal Navy, London, idling in Piccolo at 1930. (Watson-UK)
13900.0	BMB-Taipei Meteo, Taiwan, with a FAX satellite picture at 1926. (Boender-Netherlands)	24370.0	RFGW-French MFA, Paris, with encrypted FEC traffic to N2G, a French Embassy, at 0655. (Hall-RSA)
13907.0	Windmill-US Strategic Command, attempting secure communication with Good News at 1829 and 1835, then with a patch via Top Spot at 1836, finally moved to Zulu-250 (15962 kHz) by Good News at 1840. Unid-US Customs, with self-scanning tones, then calling Omaha 07B at 1854. (Haverlah-TX)	25040.0	P62-French MFA, Paris, with messages for the Brasilia embassy, in FEC, at 1805. (MADX-MD)
13927.0	AFA1AN-US Air Force MARS, Indiana, running a patch with Reach K185, at 2355. (Perron-MD)	25120.0	C6-Moroccan military, calling C603 in ALE at 1608. 123, ALE call to C6C, at 1614. C6, ALE call to C603 at 1618. (Boender-Netherlands)
13956.5	JMC-Tunisian Embassy, with encrypted SITOR-B traffic at 1000. PG3-Tunisian MFA, Tunis, encrypted traffic for IJ5, in SITOR-B at 1006, then working X4M at 1000, and JMC at 1020. (Watson-UK)	25186.0	HSP-UK military, sounding in ALE at 1837. (MADX-MD)
		25350.0	SAB- Benghazi Radio, Libya, with CW marker at 1825. (MADX-MD)
		26132.5	ZSC-Globe Wireless, Capetown, RSA, with CW, SITOR, and data marker at 1741. (MADX-MD)

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Useful Modes – or Not?

This month's column is in direct response to a frequent readers' question which goes something like "Should I buy such and such a decoder which has X and Y modes?" or "Should I buy such and such a decoder if I want to listen to X"? If you've been asking yourself the same questions, you may find some answers here. We also check-in with another user-suggested topic, a profile of the commonly heard NATO system called Link-11.

❖ What's Obsolete?

As regular readers will know, the world of HF digital communications has changed markedly over the past five years. Many traditional services like press, aero and weather have moved to satellite, and, while military and diplomatic services still make use of HF, they have transitioned to more complex PSK (Phase Shift Keyed) systems like the MIL-188-110A 2400 baud modem standard.

What does this mean for the average decoder? Basically it means that you probably will never hear the following modes any more:

ASCII	(Press Agencies)
AUTOSPEC	(North Sea Oil Rigs)
ARQ-N	(a few diplomatic services)
ARQ-670, 98 or 98	(French Diplomatic Service)
ARQ-S	(Austrian Diplomatic Service)
CIS-14	(Russian Military)
COQUELET-13	(Belgian Military)
GTOR	(Never really seriously adopted on HF)
HC-ARQ	(UNHCR)
FEC-S	(a few diplomatic services)
HNG-FEC	(Hungarian Diplomatic Service)
AX.25 Packet Radio	(Never really seriously adopted on HF)
SWED-ARQ	(Swedish Diplomatic Service)
TORG-10, 11	(Russian Weather Stations)

Nearly gone are the following modes:

DUP-ARQ	(Hungarian Diplomatic Service)
POL-ARQ	(Polish Diplomatic Service)
RS-ARQ/ALIS 228bd	(German & Italian Diplomatic Service)
RS-ARQ/ALIS 240bd	(Italian & Turkish Diplomatic Service)

As most listeners can observe, a decoder chock-full of "exotic modes" such as these above really isn't worth much from the perspective of extending your listening horizons!

❖ Still Going...

So, just what *is* useful to have, and why? Now that we've whittled down the list of modes

most commonly found in decoder software, let's look at what is likely to be used these days:

ARQ-E & E3	(French Forces)
ARQ-M2 & M4	(French Forces)
BAUDOT RTTY	(Weather & Aero Services, a few Press, Russian Intel)
Coquelet-8	(Algerian Diplomatic Service)
CROWD-36	(Russian Intelligence & Diplomatic Service)
CW	(yes, some people still use Morse Code!)
FAX	(Weather Services, and the odd Press Agency)
FEC-A	(Turkish & French Diplomatic Service though getting rare)
Piccolo-6 & 12	(British Military)
PacTOR-I	(Aid Agencies)
ROU-FEC	(Romanian Diplomatic Service, though getting rare)
SITOR-A	(Mostly ship communications & a few diplomatic services)
SITOR-B	(Mostly ship communications & a few diplomatic services)
TWINPLEX	(Spanish, Danish, Norwegian & Pakistani Diplomatic Service)

However, expect ROU-FEC, FEC-A and perhaps Coquelet-8 to join the obsolete list soon.

❖ Worth It (if you can get it)

Some of the modes most representative of the shift mentioned in the introduction to this column are now very useful to have:

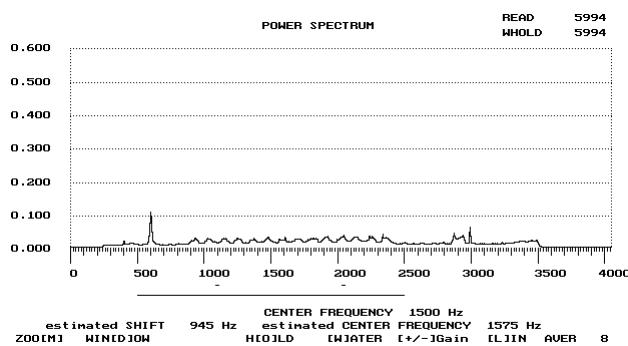
MIL-188-141A ALE	(Diplomatic, Military & Commercial Networks)
MIL-188-110A 2400bd	(Diplomatic, Military & Commercial Networks)
STANAG4285	(NATO Military)
PacTOR-II	(Email, Aid Agencies & Commercial Networks)
HF DataLink	(HF ACARS-like Aircraft Messaging & Data)

Next time you check the decoder's specifications and list of supported modes, check the lists above.

❖ System Profile: Link-11

Link-11 probably ranks pretty high on the all-time list of beginners' "What's this I'm listening to?" questions. The distinctive "rlink-dink-dink-dink" repetitive and raspy sound can be heard at just about any time and place throughout the HF spectrum.

Otherwise known as TADIL-A and often referred to as "Alligator" by operators, Link-11 is used by many NATO armies, airforces and navies to provide networked communications between ships, aircraft and ground stations, and particularly for communicating tracking and fire control information. Figure 1 shows the typical spectrum of a Conventional Link-11 Waveform



(CLEW). Perhaps the code name "alligator" comes from the alligator mouth-like spectrum?

As one can see, Link-11 uses 16 tones – 1 doppler correction tone, 14 data tones, and 1 synchronization tone. The 14 data tones are QPSK modulated and spaced every 110 Hz (from 935 Hz to 2585 Hz with the doppler tone at 605Hz). The synchronization tone is 2-PSK modulated. Typical data rates are 1364bps (HF) or 2250bps (VHF/UHF). Most Link-11's live on a round kHz USB point, and rarely on LSB. There are a number of fairly stable Link-11 frequencies, as follows:

4772 6706 8000 9120 10188 10253 11000 11190 11646 12277
13899 14364 14369 14760 15064 17444 kHz

❖ Tunisian MOI on the Move?

A number of monitors have reported ALE on at least one known Tunisian MOI frequency 13945 (the other being 14700 kHz USB). The stations "TU1", "TU2" and "TU3" have been heard calling "STAT2", "STAT15" and "STAT154" using ALE. Voice, CW and PacTOR-II have also been heard.

Resources

Link-11 CLEW Audio Clip
rover.wiesbaden.netsurf.de/~signals/WAV/LINK11-1364.WAV

Glenn Hauser

P.O. Box 1684-MT, Enid, OK 73702

wghauser@yahoo.com

www.angelfire.com/ok/worldofradio

Lose a Lot, Gain a Little

This month we report the revival of R. Ecclésia and R. Yugoslavia on shortwave, R. Vilnius doubling its North American service, while BBC decides SW is no longer justified, Austria may be next, and CBC callously cripples RCI yet again.

Tropical SW broadcasting is also on the decline, to no one's surprise, but Anker Petersen, editor of the DSWCI *Domestic Broadcasting Survey*, has quantified this. In 1972-73 there were 1136 tropical broadcasting stations; in 2000-2001, only 389. During the 24-year period 1973-1997, 452 stations disappeared for an average of 19 per year. In the three years of 1997-2000 this drastically increased to 212 stations or 71 per year on average! During the past year no less than a further 83 stations have left the tropical bands!

Since 1972, Indonesians dwindled from 171 to only 22 still on the air; High Andeans from 188 to 99. However, the situation is more or less unchanged in countries like China, Papua New Guinea, Australia and the USA.

ANGOLA [non] R. Ecclésia started relays in April via DTK Germany: 0500-0555 daily on 15545 at 160 degrees; 1800-1859 (Saturday -2130) on 13810 at 155 degrees (Dr Hansjörg Biener, *DX Listening Digest*) Schedule last month never went into effect. R. Ecclésia contact info: Rua Comandante Bulá No 118, São Paulo C.P. 3579, Luanda, Angola. Tel: +244 2 443041. Fax: +244 2 443093. E-mail: eccllesia@snet.co.ao Web Site: <http://eccllesia.snet.co.ao> (© BBC Monitoring)

ANTARCTICA LRA36, Radio Nacional Arcángel San Gabriel, 15476, in April was operating M-F only 1800-2100 with power reduced from 10 to 4 kW in order to preserve transmitter. E-mail: Ira36@infovia.com.ar (Gabriel Iván Barrera, Argentina, *Conexión Digital*)

AUSTRALIA The Australian Broadcasting Authority has allocated the first two international broadcasting licenses for shortwave broadcasts from Australia issued under the new legislative regime for international broadcasting. They have been issued to Christian Voice (which will operate from Darwin), and HCJB, which will operate from a purpose-built facility at Kununurra in the Kimberley region of north-western Australia. CV is targeting audiences in SE Asia, China and India with Chinese, English and Hindi programs. HCJB will beam towards South Asia and the South Pacific.

Applicants for international broadcasting licenses commit to abide by International Broadcasting Guidelines issued by the ABA. The licenses have been issued after consultation with the Minister for Foreign Affairs on national interest considerations (Matt Francis, Canberra, *DX Listening Digest*)

Tentative schedule of Christian Voice to India: 1000-1200 17825, 1200-1700 13795, 1700-1900 11890 (Andrew Flynn, Head of Engineering, Christian Vision, via Alokesha Gupta, ODXA)

On a visit to the Cox Peninsula site we saw six 250 kW rigs, 3 Thomson and 3 Collins. One of the Thomsons was yet to be commissioned, moved in from Carnarvon with lots of yellow sticky labels on it (Chris Martin, Darwin, ARDXC)

RA via Darwin finally resumed May 14; Indo is to C&W Indonesia; English to SE Asia (Roger Broadbent, RA, via John Figliozzi):
2130-2330 9865 Indonesian
2200-0000 13625 English
0000-0030 21680 Indonesian
0000-0130 17775 English
0400-0430 21680 Indonesian
0500-0530 21680 Indonesian

AUSTRIA R. Austria International may be next: in a May mailbag program, staff member Robert Theiler remarked that ROI may no longer exist in a couple of months (Kai Ludwig, Germany, *DX Listening Digest*)

BRAZIL A bandscan on 25 m one afternoon in the 1840-1948 UT period found the following frequencies active, mostly with sports or religion: 11725 + spurs, 11735, 11765, 11785, 11805, 11815, 11830, 11855, 11895, 11915, 11925

The main reason for all this is that FM-networks are growing in most parts of the developing world and replacing the need for shortwave transmitters. But, you can still hunt for 389 Domestic Broadcasting Stations on the Tropical Bands, before it is too late. Fortunately the interfering broadcast and utility stations are also disappearing. So do not give up your Tropical Band DXing!

Allover Shortwave Schedule

Covering the international bands is a personal project now made public by German student Eike Bierwirth, found via <http://www.eibi.de.vu> or more specifically, with no dot after www: http://wwwstud.uni-leipzig.de/~pge98crf/index_e.html or <http://wwwstud.uni-leipzig.de/~pge98crf/bc-a01.doc> (MS-Word)

This is quite a monumental opus, and updated to May 3 (maybe later by now). Says Joe Hanlon: "This site sure beats the PWBR-2001 Blue Pages, hands down!"

(Célio Romais, Porto Alegre, DX Clube do Brasil <http://www.ondascurtas.com> via radioescutas)

Heard a preacher on R. Filadélfia, 6105, say that a new religious station would be appearing soon on 6215 with better coverage (Horacio Nigro, Uruguay, *DX Listening Digest*)

BULGARIA Radio Ezra was heard Sunday at 1100 UT on new 13850, strong but an awful buzz (Noel Green, UK, *DX Listening Digest*) via Wavre, Belgium according to presenter John D Hill (Dave Kenny, Caversham, BDXC-UK) R. Ezra 13850, Sunday 1040-1114* with hummy carrier, low modulation, distorted, transmitter breakdowns. No doubt the transmitter is in really bad shape, very same technical characteristics and procedure like on the 6900 Eurosonor transmission, identified by Olle Alm as typical for the Bulgarian Kostinbrod site. It is no surprise that Hill claims to use Wavre, because the TDP [broker] is a Belgium-based operation. I think neither Hill nor the Eurosonor guys know about the actual transmitter site and bought a pig in a poke (Kai Ludwig, Germany, *DX Listening Digest*)

CANADA *Dancing the Same Dance Again:* We've been to this dance, already, too many times in the past; the Canadian public having to stand up and voice support for RCI, now once again being threatened by illogical and ill-advised cuts, masterminded by the Canadian Broadcasting Corporation.

These amount to elimination of RCI weekend, in-house produced news in Canada's two official languages, English and French. Canadians abroad, and others tuning into RCI broadcasts on weekends, will receive repackaged, condensed CBC domestic newscasts in place of RCI, produced for an international audience.

It is unimaginable that the CBC, in the wake of a \$60 million cash-cow [budget increase], and public statements by Heritage Minister Copps, would attempt to implement cuts to RCI that would put CBC in breach of contract with respect to what has been mandated by the Broadcasting Act (Sheldon Harvey, President, Canadian International DX Club)

The RCI Action Committee said the cuts, which were described by management as fiscal responsibility, would cripple the station, its credibility and would result in the loss of audiences around the world. The employees are particularly surprised by the decision, since CBC and Canadian Heritage, which funds the shortwave service, signed an agreement at the end of March to maintain the service as is. CBC Corporate Policy No 14 which came into effect May 13, 1980, says RCI is to provide "daily shortwave broadcasts" "designed to attract an international audience..." For further information: Wojtek Gwiazda, (514) 597-7350, (514) 524-2229, E-mail: rciaction@yahoo.ca, Website: <http://www.geocities.com/riciacion> (Canada News Wire via Mike Cooper, DXLD)

All our morning shows in English and in French to Africa, Europe and the Middle East are cancelled as of beginning of June. All RCI newscasts in all seven languages will

All times UTC; All frequencies kHz; * before hr = sign on,
* after hr = sign off; // = parallel programming;
+ = continuing but not monitored; 2 x freq = 2nd harmonic;
A-01=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s.
= unless otherwise stated

be cancelled on the weekends. There will be no staff in on weekends, no matter what news events may be going on in Canada. All RCI programming on the weekend in all seven languages will be pre-recorded during the week. On weekends no technicians will be in the building, except for one technician in master control. However, there will be no DALET technician to reboot our computer system of sound files if anything should go wrong. The master control technician would only be able to fill with music. We will fight on (RCI Action Committee via Ricky Leong)

COLOMBIA R. Nueva Juventud, pirate in San Juan de Pasto, heard at 0205-0230 on 5588.3, now here after trying various crystals, the owner told me. Operates Fri-Sat-Sun only, always with music (Rafael Rodriguez, Colombia, DX Listening Digest)

CONGO Am hearing Brazzaville via long-path on 9610, good strength at 0545 tune-in. Doesn't sound too African, except for occasional drum flourish, but plenty of IDs. Beware SRI via Jülich also in French 0430-0500, and BBC Ascension French from 0600, both also on 9610 (Craig Seager, Australia, ARDXC)

COSTA RICA Hate on shortwave has now become far more sophisticated and better financed than ever before. The production quality and ads now make hate radio indiscernible, in many cases, from the mainstream, except for the message. There are currently 28 transmitters in the U.S. broadcasting far right messages in both English and German. Their collective capacity is greater than that of VOA, thereby creating a curtain of hate around the U.S. which emanates outward to the world.

Due to the alarming increase in hate based radio, not only on shortwave, but on AM and FM as well, we at Radio For Peace International are inaugurating the first ever international campaign to bring awareness to and help stop this dangerous hateful rhetoric. The "Stop Hate on Radio" campaign is now underway worldwide. Radio stations, program hosts and producers, as well as concerned individuals around the world are asked to join this effort by signing a commitment form and proudly displaying the official campaign sticker. Take a stand today. Send financial contributions by check or money order, Visa or Mastercard (supply card number, expiration date and signature) to: Radio For Peace International, P.O. Box 1094, Eugene, OR 97440 (RFPI)

In mid-May, RFPI sked changed to: 15050 AM 24 hours; 21815-USB 1300-0200; 7445-USB 0200-1300. Reception reports appreciated to info@rfpi.org New on RFPI is Earthspan from the War & Peace Foundation, Fri 2100 and Mon 1700 plus repeats 6, 12, 18 hours later. See <http://www.warpeace.org>

R. Casino, Puerto Limón, 5954.2, best time to hear is *1030-1045, opening with prayer and also IDs as la Reina del Caribe (Rafael Rodriguez, Colombia, DX Listening Digest)

CROATIA [non] The Voice of Croatia, their new ID, has resumed English and Spanish news on their Jülich relays 2300-0500 on 9925; English was at 4-9 minutes past the hours (Joe Hanlon, Philadelphia, DX Listening Digest) Also heard with English 0242-0247, Spanish 0247-0256 (Rubén Guillermo Margenet, DX Listening Digest) Exact English times seem to vary (gh)

[non non] Relays of the First National Program of Hrvatski Radio, for Europe and Mediterranean Area, via the Croatian transmitter at Deanovic, are:

6165 0400-2300 100 kW
7365 0400-0900 10 kW
9830 0400-1800 100 kW
13830 0900-2300 10 kW

(Bob Padula, Melbourne, Victoria, EDXP) As distinct from the V. of Croatia external service via DTK Germany (gh)

CZECH REPUBLIC Of all the former Warsaw Pact countries, I enjoy Radio Prague the most. Production quality is quite high, and focuses on Czech matters, such as the ongoing adjustment to a market-based economy; generally doesn't seem as "heavy" as its peers. Announcers sound like they enjoy their work, and their English doesn't require intense concentration to understand (Richard D. Cuff, Easy Listening, NASWA Journal)

DIEGO GARCÍA This base for US military operations is to be handed back to the civilian population this year and it is hardly likely that the listed frequency [AFRTS 12579] will be heard again (Evan Murray, NZ DX Times)

ETHIOPIA Schedule of Voice of the Revolution of Tigray sent by director of VORT: M-F 0400-0500, 0930-1030, 1500-1900. Sat & Sun 0400-0900, 1100-1630 on 5500 and 7515, 10 kW (Rudolf Krumm, Germany, A-DX via BC-DX)

FINLAND Why R. Finland schedules are in local time: The main audience of Radio Finland are Finnish tourists and other nationals temporarily abroad who do not know the terms UT or GMT. We have received many thanks for the swap (Juhani Niinisto, YLE Radio Finland via Mike Terry, BDXC-UK)

GEORGIA Radio Khara: Main Studio: Tbilisi. Category: Domestic. Radio Khara ("We" in Abkhazian) was first heard in early 1999. It is reportedly sponsored by the Georgian-Abkhazian Relations Institute in Tbilisi with programming aimed at Georgian-Abkhaz reconciliation. Alternative frequency: 4540 kHz. Broadcasts are subject to Summer/Winter time changes. Address: Radio Khara, 52 Rustaveli Avenue, Tbilisi, Georgia. Tel: +95 32 987923. Schedule on 4875: 1600-1635 Mon & Thu in Abkhaz; repeated 0400-0435 Tue & Fri (© BBC Monitoring)

GERMANY The politician Erik Bettermann was chosen as new Deutsche Welle director. The ROI Intermedia show included a first statement from him: He doubts that foreign language broadcasts of 30 or 60 minutes

duration are of much use. Looks like further cancellations of language services at DW are to be expected (Kai Ludwig, Germany, DX Listening Digest)

GUYANA On 3291.42, GBC, at 0820. Back on 90 meters after an absence from this band, for several months. Usual format of religious programs, subcontinental music, birthday announcements (Dave Hodgson, TN, DX Listening Digest) GBC, 3291.42, since mid-April, 0825-0940+ mixing traditional religious music in English with Hindi vocals; another night 0320-0800+ with continuous BBC programming instead (Brian Alexander, PA, DX Listening Digest)

HONDURAS On 4832.00, Radio Litoral with religion in English 0325-0358* (Karel Honzik, the Czech Republic, hard-core-dx) Regular here with English religion on 4832, but one night on 4830.05 instead, same content and R. Litoral ID (Aart Rouw, Bühl, Germany, Hard-Core-DX)

HRET is off SW due to lack of funds. They want to come back on MW (Larry Baysinger, Cumbre DX)

HUNGARY Vera Sarkany spent 30 of her 53 years at R. Budapest, her first and only workplace, and her voice was one which determined the profile of Radio Budapest. She joined the Radio in the summer of 1971, immediately on graduating. She was soon editing and reporting on a wide range of topics, especially science and health. Her series, *Insight*, continued until she fell ill in November 1999. She contributed to our daily current affairs magazine programme *Hungary Today* until just four days before she left us forever on March 3rd. We lost an excellent radio journalist and an ever-helpful colleague, faithful to the English Section right until the end. Less than a year before we also lost Charlie Coutts. They are sorely missed (Budapest International, via Arthur Ward, World DX Club Contact)

INTERNATIONAL VACUUM Douglas Adams, creator of the *Hitchhiker's Guide to the Galaxy*, originally aired on BBC, died suddenly May 11 at his home in Santa Bárbara, California, of a heart attack. He was 49 (BBC Radio 2 news) See tributes at <http://www.douglasadams.com> (Chet Copeland) An interview with Adams can be found at <http://www.americanatheist.org/win98-99/T2/silverman.html> (AA Newsletter)

IRAN [non] Radio Payam-e Doost (Radio Message from a Friend) is sponsored by Washington DC-based members of the Bahá'í Faith. Web site refers to station in English as Bahá'í Radio International; aims to "educate its listeners and dissipate misinformation about the Bahá'í Faith." Commenced 21 March 1994 with a one-hour weekly program via WUST in Washington DC on 1120 kHz, now Sun 1330-1430 UT. The short-wave broadcast, via a hired transmitter in Eastern Europe or the CIS was first observed in May 2001: daily 1800-1830 on 7480. E-mail: feedback@bahairadio.org Web Site: <http://www.bahairadio.org> with archive audio (© BBC Monitoring) On exactly 7480 unlike R. Barabari an hour earlier, slightly off 7480, so may be different sites (Björn Fransson, Sweden, hard-core-dx)

Radio Barabari (Radio Equality) "a platform for breaking the walls of censorship and oppression" started in May, irr. 1700-1730 on 7480v. E-mail: info@barabari.org Web Site: <http://www.barabari.org/> with archive audio (© BBC Monitoring)

ISRAEL Instead of 21665 as planned, Israel Radio's summer frequency from May through September is 21670 for English at 1600-1630 (Moshe Oren, Bezeq, DX Listening Digest) Avoids BBC 21660 (gh)

KENYA KBC is often silent, but occasionally heard on 4885, 4915 or 4935; technical problems (Mahendra Vaghee, Mauritius, BC-DX)

LITHUANIA Complaints from NA listeners about poor reception at new time of 2330 on 9875 led R. Vilnius to add a repeat at 0030 on 11690. Also announced likely to add internet audio at same times (Alan Roe, UK, DX Listening Digest) 11690 has splash from adjacent frequencies; 9875 better here (Bob Thomas, CT, DX Listening Digest)

MALTA [non] Voice of the Mediterranean English broadcasts are now 0600-0630 on 6110 Mon-Sat, 0800-0900 on 11770 Sun, via Italy and 1900-2000 on 12060 Sat to Thu via Russia (Mike Barracough, England, World DX Club Contact)

MÉXICO Radio Mexico International via website <http://www.imer.gob.mx> has a pdf questionnaire it asks listeners to fill out and return postally (Cristina del Razo, Station Manager, Radio Mexico International, via Mike Terry, BDXC-UK)

PAKISTAN Radio Pakistan's special News and Current Affairs channel was inaugurated on 18 April 2001 from Broadcasting House, Constitution Avenue, Islamabad. Tel: +92 51 921 0689. Fax: +92 51 920 1861. 1225-1800 Daily in Urdu on 7265 and 7365 (© BBC Monitoring)

PARAGUAY R. Nacional has a special program for Paraguayans abroad, *Ventana al Mundo*, Sundays 2300-0300v on 9737.5, subject to sports or cultural preemptions (Mauricio Remillier via Arnaldo Slaen, Conexión Digital) *0850 with beautiful Paraguayan folk music, morning prayer by Pope John Paul II; Sundays opens at *1000 (Takayuki Inoue Nozaki, Japan)

PERÚ On 5175.49, new Peruvian! L.P.C. La Radio premiered April 20 at 1100 (Björn Malm, Ecuador, SW Bulletin) 5175.8, 2321-0250* with pentecostal alabanza music. Nominal 5165 and sked 1000-0300 but heard at 0250* and *0950 (Rafael Rodríguez, Colombia, DX Listening Digest) Location is Gerillo, in Distrito Jepelacio, Provincia de Moyobamba, Departamento de San Martín (Henrik Klemetz, Sweden, DXLD) 5175.48, L.P.C. Radio Contiente, Gerillo; stands for "La Petición Contestada".

On 6339.67, San Miguel Arcángel Radio, provincia de San Miguel, departamento de Cajamarca in May until 1205* (Björn Malm, Ecuador,

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On 6956.65, Radio La Voz del Campesino, Huarmaca, 1120-1150 Amanecer Campesino with first class OA folk music and personal messages (Takayuki Inoue Nozaki, Relámpago DX Logging) 6956.56, 0250-0300 blasting in with excellent music (Robert Wilkner, FL, hard-core-dx) On late for Mother's Day (gh)

RWANDA Radio Rwanda, 6055 is easy catch evenings, seems to have extended till 2200 (Thorsten Hallmann, Autonomous Republic of Westphalia, DX Listening Digest)

SOMALIA R. Mogadishu, Voice of the People is quite regular with good signals on 6750 USB until 1900* after Koran and anthem (Mike Barracough, England, World DX Club Contact)

SWEDEN [non] On at least two nights in May, R. Sweden relay at 0300 was heard on the CBC North Quebec frequency 9625 (Ricky Leong, Quebec, DX Listening Digest) 9625 synchronized with much stronger 11895, so Sackville (or Montréal) does it again, mixing up feeds internally, this time at the expense of the poor Northern Quebecers (gh) Reception is so good via Sackville 11895 for the 0330 English broadcast, that we are pulling the plug on the direct frequency 9495 May 21 (George Wood, SCDF/MediaScan)

TAIWAN Radio Taipei Int'l is looking for official monitors, starting July 1 for one year: 3 reports per month. Monitors will receive a CD of Taiwanese music. If interested, write or email RTI ASAP (Bill Bergadano, NJ, DX Listening Digest)

RTI program schedule shows that one set of features is on the UT 02, 07, 12, 16 and 22; another set on the 03, 11, 13, 17 and 18; except on Tuesdays and Wednesdays when all are the same (via Christopher J Williams, World DX Club Contact)

THAILAND Toward end of last millennium, Royal Thai Government ordered R. Thailand to add 15-minute daily broadcasts in remaining official languages of ASEAN and UN, Spanish, Russian, Tagalog, Hindi and Cantonese. These are still planned, and could start within the next year. Also being investigated, possibility of a relay station for the Americas (Amporn, R. Thailand director, interviewed by Jeff White months ago, on RN Radio Enlace in May)

TURKEY Live from Turkey, Tue 2219-2255 on 11845 and webcast, has been getting few calls; Reshide remarked they might move it earlier, more convenient for Europe. So that would be 1830 or 2030 UT (gh)

UKRAINE Alexander Yegorov, R. Ukraine International informed me 13590 changed to 12040 April 28, including English at 2100, 0000, 0300. And 12040 is much improved over 13590 (Kraig Krist, KG4LAC, DX Listening Digest)

UNITED ARAB EMIRATES UAE Radio Dubai monitored using four frequencies again for English: 1030-1050 on 13675 15370 15395 21605, 1330-1355 and 1600-1640 on 13630 13675 15395 21605 (Mike Barracough, England, World DX Club Contact)

UNITED KINGDOM You may read elsewhere in this issue about BBC dropping SW to North America from July 1 (gh) Following are various reactions:

Response from management shows their basic misunderstanding of what a "real" BBC listener is.

They just count the people who listen to a bit of BBC newscast on public radio or who listen to the joint BBC/PRI "World" program as BBC listeners. A real BBC listener is someone like me, who wakes up in the morning and puts in an earphone while my wife is still asleep and listens to *Outlook* and then one of the Meridian programmes, followed by the science and ecosystem-related programs that come in the next hour. Someone who sets an alarm to wake up at 5:30 AM on a Saturday to hear *Science In Action*. Someone who tapes *Discovery* because it is on in the evening opposite a favorite TV show. Someone who will follow all the episodes of "Tale of Two Cities" on *Off The Shelf*. Someone who has to decide whether to watch TV or listen to a BBC programme in the evening, and ends up listening while videotaping the TV for later viewing, and has hundreds of unwatched tapes as a result!

I have no computer at home, so Internet listening is not an option. Even if it were, how could I do it the same as I now use a shortwave radio next to the bed? I just punch a button to turn it on, and a memory button to bring up the best current BBC shortwave frequency. How could I do this with a computer without waking my wife, and filling the bedside with equipment, and spending money every month for a service provider? Let's get rid of the managers who made this decision, and keep the BBC on shortwave to the entire world (William Martin, MO, replying to BBC Write On)

It seems to be quite clear that the BBC will cancel all transmissions via Sackville and WYFR, because they aim at North America exclusively (Kai Ludwig, Germany, DX Listening Digest)

Dropping shortwave to the United States, Canada, Australia, and New Zealand will save BBC \$700,000 per year, money which will be used to increase the FM and Internet of World Service. BBC World Service would not reveal how many listeners it has in the United States, but says that 88% of their audience in North America listens on FM, and only 12% listens exclusively via shortwave. Yes, there is occasional fading on shortwave. That's part of the experience. It's nature's way of reminding us that it is a privilege to listen to a radio station from another country, far away. Among shortwave broadcast listeners in the United States, BBC WS is the most popular station. Many of us think the

programming is better than from anything we can hear on U.S. radio stations, commercial or noncommercial. Shortwave will not be the same without BBC World Service. BBC World Service will not be the same without shortwave (Kim Elliott, VOA Communications World, std disclaimer)

WWFV offers to relay the BBC on one new AM transmitter, 24/7 for \$25 an hour, about \$219K per year; such as 15 MHz day, 6 MHz night. This could be paid for by listeners if not the BBC (WWFV, rec.radio.shortwave via John Norfolk) I think this is a major policy change, not just to save a few pounds, and doubt the BBC WS would even allow SW relays to be arranged via WWFV or any other site, paid for by someone else (gh)

As a UK taxpayer I actually pay for the BBC World Service. The real question is what does the BBC World Service do for us poor mugs that pay for it? Nothing at all as far as I can see. Does it increase Britain's influence? From Suez to Grenada we can see that when push comes to shove US administrations take precisely no notice of us. Does it improve the image of British people? Well I don't know, but many of us wonder why all the villains in Disney films are English? Seems the message isn't getting across. Perhaps no-one's listening? For all my life the British Government has shut down radio stations that I loved. Big L, Atlantis, Caroline, Radiofax - they closed the lot. Live with it. We've had to (Nicholas Mead, Cornwall, DX Listening Digest)

Something which no one seems to have realized yet: the frequencies vacated by BBC to North America will go begging for new clients. Merlin has shown us in many other situations that they will sell time to anybody, including gospel hucksters. As long as the transmitters are still functional, we well may start hearing g.h. and far-right hate shows on former BBC frequencies. Thus BBC's departure will add insult to injury (Glenn Hauser, DX Listening Digest)

USA WBCQ-2 shifted to 9330-CUSB, and changed WORLD OF RADIO to UT Thu 0400, better for West Coast, just a few hours after first airing Wed 2330 on 7415. WWCR cancelled the Sun 1900 WOR broadcast. See our website (at head of column) for latest schedule (gh)

VOA's expanded Arabic service with five separate targeted streams will amount to 60 to 64 hours per day; add R. Free Iraq for a total of 69 to 73 hpd in Arabic from the US (Kim Elliott, VOA Communications World via John Norfolk)

The BBG has decided for now to make no changes in the existing VOA Thai broadcasting services. The Board will also maintain 30 minutes a day in Turkish and 15 in Uzbek (BBG Newsletter)

WNND Meridian, MS, heard on 2579.86, 2 x 1290 harmonic, 0907-0918 with Soul/Gospel music, ads, ID (Mark Mohrman, VT, DX Listening Digest)

Seldom Heard Radio, produced in the spirit of free radio, is heard every Sunday at 0500 UT on WRMI 7385. Includes folk, folk-rock, psychedelic and independent music from the 1960s to the present in a unique homespun format (Fred Moe, Producer, WORLD OF RADIO)

WMLK planned to have their 250 kW on air by May, but has been pushed back to June (Hans Johnson, Cumbre DX) Check 9465, 15265 afternoons (gh)

WWFV has been authorized by the FCC to start using 5975 July 1 if the BBC bails out (WWFV, rec.radio.shortwave via John Norfolk)

United Patriot Radio, clandestine from Kentucky, still wasn't busted in May, heard on new 6900 USB daytime, 3260 at night. The Anti-Defamation League (ADL) says they have been monitoring Steve Anderson and his UPR. The ADL accuse Anderson of making anti-Semitic comments on the air and have identified him as a member of the Christian Identity 'church.' (Hans Johnson, Cumbre DX)

VENEZUELA R Rumbos programming heard on 8860 at 1025-1107, spur from Ecos del Torbes on 9640, not \ 4980 (David Hodgson, TN, DX Listening Digest) 8860 = 9640 minus 780, Torbes MW frequency (gh) Ecos del Torbes was active again in April on 4980, but could be gone tomorrow (Karel Honzik, Czech Republic, hard-core-dx)

DXers last winter reported Torbes on 4980 at least once in each of the months October, November, December, January, February, March and April. But the transmitter has been unstable for at least 12 months, in use sporadically, on the air some nights and off most others. Unfortunately this situation is typical not only for Ecos del Torbes, but for several tropical broadcasting stations nowadays (Anker Petersen, DSWCI)

VIETNAM [non] Clandestine programs as now scheduled on KWHR, Hawaii, 9930:

Mon-Sat 1230-1400 Que Huong Radio

Daily 1400-1500 Radio Free Asia Vietnamese

Mon-Sat 1500-1600 Radio Free Vietnam (WHR website)

YUGOSLAVIA Nine months after the authorities in Bosnia-Hercegovina forced the closure of Radio Yugoslavia's transmitter site at Bijeljina, shortwave broadcasts resumed 14 May, including English:

0000-0030 11870 C&ENAm (exc. Sun)

0430-0500 11870 WNAm

1830-1900 6100 WEu

2100-2130 6100 Eu

2200-2230 7230 Au (exc. Sat)

Full schedule in all languages: <http://www.radioyu.org> (Andy Sennett, Media Network)

Until the Next, Best of DX and 73 de Glenn!

Gayle Van Horn

gayle@webworkz.com

0008 UTC on 4915

BRAZIL: Radio Anhanguera. Portuguese. Up beat announcer's chat to station promos and station ID. heard as, "Nacional" and "Radio Anhanguera" at 0013. (Harold Fodge, Midland, MI) Brazil's **Radio Caiari** 4785, 0151-0204. Religious format to ID as "a Radio da familia...Radio Caiari..", very low signal, best in LSB. (Daniel Canonica, Muggio, Switzerland)

0035 UTC on 6950.45

PIRATE: Radio Free Speech SW. Earl Pitts & Paul Harvey commentary plus other inciteful bits. SIO=333. Minimal whiny interferences. **World Parody Network** heard on 6950; 0306-0318. Capt. Squirlong and a female companion sing *I Love Myself* melody to Huntsville maildrop address. SIO=333. (Harold Fodge, Midland, MI)

0240 UTC on 6950LSB

PIRATE: Radio XANAX. DJ reading letters into intro for *Apocalypse Now* segments. Echo effect ID with Stoneham pirate maildrop address. Pirate-**Syck Radio** 6950USB, *2334-2348*, heavy rock format "Abortive Attempt"-good name for a hard rock band. Audible *0323-0336* with Non Top 40 rock music program. (Fodge, MI)

0300 UTC on 3260 USB

CLANDESTINE-USA: United Patriot Radio. New name change for Kentucky State Militia (KSM). Commentary on Mark Koernke's case. 6880, 2338-0000+ with *Genesis Proactive News* and discussion on mind control. (Fodge, MI) Program should be on 12182 USB during the daytime. Station website <www.freekentucky.com/ksm/contents.htm>

0320 UTC on 11750

NETHERLANDS ANTILLES: Deutsche Welle relay. Informative program focus on computer viruses. (David W. Weronka, Benson, NC) *A Good Life* program 1900, 17605. (Bob Fraser, Cohasset, MA) **Antigua relay** 2220, 15410 German service. (Weronka, NC)

0320 UTC on 6015

ZANZIBAR: Radio Zanzibar. Swahili. Extended news bulletin and regional commercials. Strong signal and minimal interferences from Iran's VOIRI to 0328. (Vittorio De Tomasi-IK2CZL, Milano, Italy/HCDX)

0330 UTC on 11865

SEYCHELLES: BBC. Commentary to radio drama of fair signal quality. (Weronka, NC) BBC via UK 9410, 2110 One Planet program on cloning. (Fraser, MA) **BBC via Singapore** 6195, 2330 including ID, world news and *Greenfield Collection* focus. (William McGuire, Cheryl, MD; Frank Hillton, Charleston, SC)

0547 UTC on 7154.5

MADAGASCAR: RTV-Malagasy. Malagasy comments and announcements to instrumental music. Time signal tone and station identification. SINPO=33222. (Morales, ARG) **Radio Canada Int'l-Madagascar relay** 1810, 13640 with *Maple Leaf Mailbag*. (Fraser, MA; Sam Wright, Biloxi, MS) RTV-Malagasy 5009.6, 1726+. (Zacharias Linagas, Thessalonikis, Greece/Hard Core DX)

0700 UTC on 15110

KUWAIT: Radio Kuwait. Pop music program throughout hour to station ID, address and intros into Arabic service. News briefs and listener phone-in. (Liargas, GRC) 11990, 2035 with musical segments. (Weronka, NC)

1039 UTC on 5952.48

BOLIVIA: Radio Pio XII. Spanish news text from male/female duo to announcement, "el presidente del Consejo Municipal de Guarí hizo la siguiente denuncia por Radio Pio XII." Bolivia's **Radio Fides** audible on 6155 at 1055. Musical program to Aymara spoken text. No sign of // 4845. (Arnaldo L. Slaen, Buenos Aires, Argentina)

1100 UTC on 15375

CHILE: Radio Voz Cristiana. Spanish religious programming to half-hour station identification. (Roy Unger, Front Royal, VA) Station website: <www.vozcristiana.com>

1320 UTC on 6140

URUGUAY: Radio Montecarlo. Spanish programming in // with 930 // 770 AM kHz (Radio Oriental, Montevideo). Cycle competition

"Rutas de America". Commercials for Club Progreso, J&M Cigarettes, Banco de Seguros del Estado. SIO=44433. (Slaen, ARG) **Emisora Ciudad de Montevideo**, 2245-2315. Sports updates, ID and auto commercials. (Klaus Elsebusch, Marienthal, Germany) **SODRE**, Montevideo 1245-1305 program Asi es Carlos Gardel to ID; "transmite CXA26 Radiodifusion Nacional Sodre, en 1050 kHz y su onda corta CXA4 en 6125 kHz..." (Slaen, ARG)

1802 UTC on 19160

GABON: Africa # 1. Spurious signal audible from normal 9580 kHz. African news features with remotes to "Africa bon soir" at 1814 followed by sports. "Radio Africaine" and "Africa # 1" at 1830. Nothing noted on // 15475. SIO=534 with interferences noted. (Fodge, MI)

1810 UTC on 9890

RUSSIA: Voice of Russia. Moscow Mailbag program with fair signal quality, // 9775, 11510. (Bob Fraser, Cohasset, MA) 2003-2015+, 15455 with ID and mailbag program. (Fodge, MI) 7180, 0355-0420+. (Weronka, NC) Russian's- **Radio Maryia** (via Samara) Polish on 7400, 2158-2213; **Radio Rossiia** (via Irkutsk) Russian on 7440, 1008-1023; 4485, 1815 . **VOA via Petropavlovsk-Kamchatsky relay**, 12065, 2130-2159. ID to Korean service reports, news and music to 2159*. (Morales, ARG; Liargas, GRC)

1947 UTC on 9565

USA: Radio Marti. Spanish programming with IDs and Spanish rendition of Diana Ross/Lionel Ritchie's *Endless Love* tune. Audible to 2001*. (Martin Brown, Brampton, Ontario, Canada) WYFR's Spanish broadcast 18980, 1844-1845+ with ID, interfering with more dominant WYFR English service on frequency for about a minute. (Fodge, MI)

2018 UTC on 15640

ISRAEL: Kol Israel. Commentary on Israel-Palestinian conflicts. National weather temps and news headlines. "Shalom From Israel" ID to interval signal and sign off. French service *2030. (Fodge, MI) 9435 at 2020, // 11605, 15650. (Fraser, MA) Audible 1915-1925*, 17545 with features to ID. Program line up and frequency quote. (Duane Hadley, Bristol, TN) Station-Galei Zahal 0330-0335, 6973. (Slaen, ARG)

2034 UTC on 15160

ALGERIA: Radio Algeria. Tentative logging to 2050*. News features and editorial to tentative ID at 2047, just prior to world news summary. Sign-off with "it's 10 minutes till 9 now", which would have been Algerian time. (Fodge, MI)

2108 UTC on 13750

CUBA: Radio Havana. Sports Beat program. (Fraser, MA) 13660 USB noted in //. Station English noted; 0100-0300, 9820, // 11705 USB. (Tom Banks, Dallas, TX)

2200 UTC on 6055

JAPAN: Radio Tampa. Time signal tone to station ID. Instrumental classical music to male/female announcers' Japanese text and conversation. (Morales, ARG) **Radio Japan** 6110, 0555 with 44 Minutes program. (Weronka, NC) Monitored English service 0600-0700, 11740, 13630, 15195; // 17870, 21755 unaudible. (Banks, TX) 1228, 9750 in Japanese. (Liargas, GRC) 2155-2200+, 17825 closing bits of programming to station ID, address and schedule. Japanese service at 2200, SIO=332. (Fodge, MI)

2326 UTC on 4965

ZAMBIA: Radio Christian Voice. English religious program of musical "gospel spirituals", to station identification. (Hilton, SC; Banks, TX) **Radio Zambia** 6265, 2130-2200. English interviews and regional music. SINPO=44333. (Claudio Morales, ARG/HCDX)

2328 UTC on 5008.85

DOMINICAN REP: Radio Cristal Int'l. Station ID heard as, "La Luz de la Esperanza" followed by "Radio Cristal International." News-cast to pop music tunes. Signal SIO+323. (Canonica, SUI)

Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com)
English broadcast unless otherwise noted.

QSLing International Amateur Radio Operators

In last month's column we tipped *MT* readers off on a great opportunity to QSL U.S. and Canadian amateur radio operators during the annual June American Radio Relay League (ARRL) Field Day. If you enjoyed last month's activity and want an even more demanding challenge, then fire up that HF receiver the second weekend of this month for the Olympics of the amateur radio world – the International Amateur Radio Union (IARU) HF World Championships.

Unlike the Field Day event which was open to U.S. and Canadian hams only, this contest is global in nature and draws participants from all over the world on the air for a 24 hour event. This is a perfect opportunity for SWLs as well as ham radio operators to add to their country totals. In last year's contest 105 countries submitted entries in this grueling event. That is a hefty bunch of DX to work in a short period of time. Most new hams are able to work enough stations during this contest weekend to earn the coveted ARRL DXCC (DX Century Club – 100 countries verified).

And remember QSLing hams couldn't be easier. Note their call sign, frequency, time, date, and who they worked and give them a signal report. Put this on a card. But now you will have to get your card overseas. This represents new challenges that do not come into play when verifying the U.S. or Canadian hams.

After the contest is over and you have

decided to send your card/report to a specific station here are a few ideas to guarantee success. Our first task is to decide where to send your report. Your first stop should be at the pages of NG3K on the internet at <http://cpcug.org/user/wfeidt/>. Here you will find special listings on various participants in the contest and their QSL routes (who/where to send your card to get the station verified).

Some foreign stations have hams in the U.S. or other countries to handle their QSL request (they are known as "QSL managers"). If the station you worked has a U.S. QSL manager, you have saved yourself a lot of time and money getting that QSL card. If the NG3K website above doesn't mention the station you want to QSL then move on to the QRZ website and their QSL Corner at [http://www.qrz.com/sqsl.html?](http://www.qrz.com/sqsl.html)

Finally, if your research fails to turn up a QSL manager for the foreign station you want to verify, you can send your request directly to the ham using his address found on the QRZ website. Go to <http://www.qrz.com>, plug in the call sign you heard, and you will get all the information you need to contact that ham directly via snail mail.

If you are a dedicated verification junkie and love to get QSL cards in your mailbox, you are going to love the weekend of July 14-15, 2001. Fire up that rig, give the dial a spin and see how many countries you can work that weekend.



ICELAND

Icelandic National Broadcasting Service, 11402 kHz. Full data *Blue Lagoon* card unsigned. Received in seven weeks for an English report. Station address: Efstaleiti 1, 150 Reykjavik, Iceland. (Don Dacus, Russellville, AR)

ITALY

Adventist World Radio, 17820 kHz. Full data *Zaokaskaya Seminariya Adventistov* card signed by Gysinn Ruf-Listener Mail Dept., plus letter from verie signer. Received in 18 days for an English report and one US dollar. Station address: AWR Europe, Casella Postale 383, 1-47100 Forli, Italy. (Comeau, MA)

IAR Rome Radio, 12602.5 kHz. Full data letter and frequency schedule. Received in 48 days for a utility report. Station address: Telecom Italia, MI.R.SR., Viale Parco De Medici, 61 00148 Rome, Italy. (George Clement, Powder Springs, GA)

MEDIUM WAVE

CHWO, 740 kHz AM. Full data QSL card, schedule, station info sheet and ODXA info. Received in two months for an AM report. Station address: P.O. Box 740, Station A, Toronto, Ontario, Canada M5W 4K6 (Dacus, AR)

CKWX, 1130 kHz AM. Canada. Full data QSL card signed by Jack W.-Chief Engineer. Card returned in envelope with my dollar enclosure. Received in 20 days for an AM report. Station address: 2440 Ash St., Vancouver BC Canada V5Z 4J6. (Patrick M. Griffith-N0NNK/WPE9HVW, Westminster, CO)

KKOB, 25910 kHz AM. Full data verification on station letterhead, signed by Mike Langner-Chief Engineer. Received in ten days for an AM report and an SASE (not used for reply). This partly makes up for the QSL I didn't receive from them several years ago on 770 AM, which they denied being the station I heard ID as, "the Great Voice of the Southwest." Station address: Citadel Southwest, Radio Center, 500 4th St., NW, Albuquerque, NM 87102-2102. (Harold Fodge, Midland, MI)

KMKI, 620 kHz AM. Plano, TX. No data folder *Radio Disney* card with handwritten "You heard us!", signed by Tish Thompson-Creative Coordinator, plus station "AM 620" promo goodies including; pencils, stickers, and promo card of *Radio Disney* DJs. Received in 15 days for an AM report and one US dollar. Station address: 2221 E. Lamar Blvd., Suite 400, Arlington, TX 76006. (Griffith, CO)

PHILIPPINES

DXAB, 1296 kHz AM. Philippines. Friendly letter from verie signer Micomim Prudencio Alojado-Station Manager, plus station stickers. Received in 97 days for a taped report. Station address: KM-4, Shine Hills, Martina, Davao City, Philippines. (Patrick Martin, Seaside, OR)

Dwdx, 1161 kHz AM. Philippines. Handwritten letter signed by Gaudencia Y. Sabella-Engineering Dept. Letter mentioned the station was 1 kW. Received in 90 days for a taped report. Station address: Cor. P. Reyes and Palima Gil Streets, 8000 Davao City, Philippines. Nice surprise to receive two Philippine QSLs on the same day. (Martin, OR)

Radyo Pilipinas, 15190 kHz. Full data verification card signed by Tanny V. Rodriguez-Station Manager. Received in 356 days for an English report. Station address: Philippine Broadcasting Service, 4th Floor, PIA Bldg., Visayas Avenue, Quezon City 1100, Metro Manila, Philippines. (Enzio Gehrig, Denia, Spain/HCDX)

John Figliozzi

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New Media, the BBC and Magazines

If, at this late date, the news that (as of July 1) the **BBC World Service** will stop using shortwave to serve North America, Australia and New Zealand is indeed news to you, you may want to review how you are receiving your information!

That simple statement may serve as an apt summary of the central issue raised by that **BBC** decision.

At one time, newspapers and magazines were what people relied upon for news of what was going on in the world. As hard as this may be for us in the 21st century to believe, these instruments once represented the most timely and immediate way of keeping up. Now, of course, we have several means of receiving virtually instantaneous transmission of information – so much so, that we have debates over which of these immediate technologies is best!

The worst bias in these debates is the simplistic argument that what is newest must be automatically the best. That is clearly not true as evidenced by the magazine you are holding in your hands. The advent of a new technology rarely renders older technologies obsolete. But, new technologies always force a reevaluation of all prior existing technologies.

So, to get back to our magazine, this means that someone relying on **MT** for their up-to-the-minute radio hobby news is going to hear about it much later than someone relying on one or more of the newer technologies (like even radio!). But, the magazine still fills a number of useful roles: as a chronicle, as a way to consider things in a more leisurely and considered manner, as a collection of relatively “recent” information gathered into a convenient form.

Of course, the second worst bias is that which says that what we already have is enough. As Andy Sennitt of **Radio Netherlands’ Media Network** e-zine put it, if that were true “instead of CDs, we’d still be using scratchy old cylinders and wind-up motors.”

◆ A Question of Balance

International broadcasters, who once only had domestically-based shortwave transmitters as a means of delivery, now also have shortwave relays, direct satellite (in analog and digital forms), FM and AM/MW rebroadcast in the target area, and the Internet to choose from. The current wisdom says that the savvy international broadcaster will develop a scheme using this entire array of delivery systems in such a way as to ensure the optimum use of each.

This balancing act is challenging on its own, but is made even more daunting by the fact that the available budget is never enough to afford the broadcaster the luxury of using all of them to their fullest capacity. Compromise is a necessity and the added pressure does little to improve the chances of finding the right precise mix.

◆ The BBC as DX Catch?

Thus, we have arrived at the current dilemma. Certainly without shortwave frequencies specifically targeted to the US and Canada, the quality and consistency of reception of **BBC World Service** broadcasts here will be significantly affected. However, that doesn’t mean the **BBC** will now be heard so poorly on shortwave that the experience will now be aurally unpleasant or even painful. We listeners are just going to have to be a little more creative in our approach.

Frequencies serving the Caribbean, Central and South America will remain on the air and these should provide adequate and even, at times, excellent reception of the Americas stream in at least the eastern half of North America.

Fortunately, shortwave signals at their fickle best refuse to be confined to a particular geographic target. Therefore, frequencies to other areas regularly offer us an added opportunity to hear the **World Service**, albeit via one or more of the other streams. For those in the western half of North America, their best opportunities will come from some of the frequencies used by the **BBC**’s relay transmitters in the Middle East and Southeast Asia. For those in eastern North America, the **BBC**’s transmitters in Europe, Africa and the Middle East offer similar possibilities. To help, beginning with this issue of **MT**, we will include, in the *Shortwave Program Guide* section, some program listings for the other **BBC World Service** transmission streams, in addition to the Americas stream.

Here are some preliminary suggestions:

◆ Best for eastern half of North America:

- These frequencies, targeting the Caribbean, Central and South America, will continue to carry the **Americas stream**: 5975 via Antigua (2100-0400), 6135 via Delano (0200-0400), 9915 via the UK direct (0000-0300) and 12095 via Ascension Island (2100-0300) should still be available to us during our evenings; and 6195

via Antigua (1000-1400), 15190 via Ascension Island (0900-1130), 15220 via Antigua (1100-1400), 17790 via Ascension Island (1100-1130) and 17840 via Antigua (1400-1700) during our mornings.

- These frequencies target Europe, North Africa and the Middle East and carry either the **Europe/North Africa** or **Middle East streams**: 6195 via the UK (0200-0700), 9410 via the UK (0400-0800) and via Cyprus (0200-0400 and 1500-2200), 12035 via Cyprus (0400-0500), 12095 via Cyprus and then the UK (0200-2100).

- These frequencies carry the **Africa streams**: 6005 via Ascension Island (0300-0700), 7120 via Meyerton (0300-0500), 7160 via Ascension Island (0300-0700), 11835 via the UK (2000-2300), 15400 via Ascension Island (1500-2300), 17830 via Ascension Island (1100-2100), 21470 via the Seychelles (1100-1300) and via Ascension Island (1300-1900) and 21660 via Cyprus (1400-1700).

◆ Best for western half of North America:

Since I live near the east coast, I asked Stewart MacKenzie of the **American Shortwave Listeners Club**, based in southern California, for help in identifying **BBC** frequencies originating from transmitters in Asia, the Middle East and Africa that are heard fairly reliably on the west coast. These frequencies broadcast the **East Asia** or **South Asia streams**.

Here’s what Stewart suggests: 5965 via Oman (0000-0200), 6005 via the Seychelles (1700-1745, 1845-2200), 6195 via Singapore and other locations (0900-0630), 7105 via Singapore (2200-0030), 9410 via Cyprus and other locations (0200-2215), 9510 via Oman (1700-1830), 12095 via several locations (virtually around the clock).

Other frequencies to try include 9740 via Singapore (0500-1600), 11955 via Singapore (0900-1100 and 2200-0000) and via Oman (0000-0300), 15310 via Oman (0300-0600 and 0900-1700), and 15360 via Singapore (0000-0330 and 0500-1030).

Feel free to use this column as a means of exchanging information about usable BBC frequencies in your area. I’ll pass on any and all information you send me. Making lemonade out of lemons, good listening!



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America

5995am 6130ca 7405am 9455af

① ② ⑤ ③ ④

⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑥, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑦ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations

and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before publication.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs appear on the lower half of the page for prime listening hours – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

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Program Highlights

VOA Adds Feature Repeats

Some VOA weekend programming is being repeated during the week. The following features now air at 0033, 0433, 0833, 1233 and 2033: M-Press Conference USA, T-Encounter, W-Our World, H-Kaleidoscope, F-Best of 'Talk to America.'

BBC Streams Added

With the elimination of shortwave to North America, the BBC's Americas stream should still be heard here via frequencies to the Caribbean, Central and South America – but at slightly different times than that to which we've become accustomed. Assuming the BBC's frequency charts hold for the remainder of the A01 season, the Americas stream will be on shortwave 0900-1000, 1015-1700 and 2100-0400 only. MT's shortwave program listings reflect this change. (*The frequency section has retained the North American and Australian streams for one more month until specifics are known - ed.*)

In addition, program listings for other streams have been added at times when reception should at least be possible somewhere in North America. Refer to the frequency lists and experiment. Some frequencies may work quite well for your sector of the continent. Identifying which frequency belongs to which stream will be an added challenge at times. Sometimes the same frequency is used simultaneously for different streams in different parts of the world; and some frequencies switch streams with time.

RCI Changes

An unexpected budget shortfall has resulted in major changes to RCI programming. All foreign language programs are being reduced to 30 minutes and will run Monday-Friday. Weekly English and French programs will run on weekends and will include Canada in the World, International Trade and Technology, Meet the Press, Arts and Culture, Mailbag and chat. News will not be aired on weekends.

Radio Yugoslavia Returns

In early May, Radio Yugoslavia returned to the air. At editorial deadline, it still wasn't clear what sort of program features and scheduling the station is pursuing; but we'll attempt to put something together for the August issue. Broadcast times and frequencies are listed in the frequency section of the Shortwave Guide.

Bush Telegraph

Radio Australia has added this program, in two forms, to its schedule. A daily rebroadcast of the version aired on the domestic Radio National network goes out at 1705 UT, Monday through Friday. In addition, RA's John Westland compiles a weekend edition of the program that draws from the best of the week's broadcasts. The latter replaces *In Conversation-Rural Edition* in the schedule, which has been discontinued. Both programs focus on providing an entertaining look at Australian rural and regional issues. Helen Brown hosts the weekday version.

Shortwave Guide


0000 UTC - 8PM E / 7PM C / 5PM P

0000 0015	Cambodia, National Radio Of	11940as		
0000 0015	Japan, Radio	6145na	13650pa	17810pa
0000 0027	Czech Rep, Radio Prague Intl	7345na	11615na	
0000 0030	Australia, Radio	9660pa	12080pa	15415as
		15415as	17580pa	17775as
		21740va		17795va
0000 0030	Egypt, Radio Cairo	9900am		
0000 0030	Thailand, Radio	9655af	9690af	11905af
0000 0030	UK, BBC World Service	3915as	5965as	5975am
		6195as	7105as	9410me
		9915sa	11945as	11955as
		15280as	15310as	15360as
		17790as		17615as
0000 0030 mtwhfa	Yugoslavia, Radio	11870am		
0000 0045	India, All India Radio	9705as	9950as	11620as
0000 0056	North Korea, Voice of Korea	4405va	11460na	11710na
		15180na		13760na
0000 0057	Canada, R Canada International	11895as		
0000 0100	Anguilla, Caribbean Beacon	6090am		
0000 0100 vl	Australia, ABC/Alice Springs	4835do		
0000 0100 vl	Australia, ABC/Katherine	5025do		
0000 0100 vl	Australia, ABC/Tennant Creek	4910do		
0000 0100	Australia, Christian Voice	17775pa	21680pa	
0000 0100	Canada, CBC Northern Service	9625do		
0000 0100	Canada, CFRX Toronto ON	6070do		
0000 0100	Canada, CFVP Calgary AB	6030do		
0000 0100	Canada, CHNX Halifax, NS	6130do		
0000 0100	Canada, CKZN St John's NF	6160do		
0000 0100	Canada, CKZU Vancouver BC	6160do		
0000 0100	Costa Rica, R for Peace Intl	7455irr	15049va	
0000 0100	Costa Rica, University Network	5030am	6150am	7375am
		11870am	13749na	9724sa
0000 0100	Ecuador, HCJB	9745na	15115na	21455usb
0000 0100 o/monthly	Finland, Scandy Weekend Radio	11720va		
0000 0100	Guyana, Voice of	3289do	5949do	
0000 0100	Japan, Radio	6145na		
0000 0100	Malaysia, Radio	7295do		
0000 0100	Malaysia, RTM Kota Kinabalu	5980do		
0000 0100	Malaysia, RTM Sarawak	7160do		
0000 0100 vl	Namibia, Namibian BC Corp	3270af	3289af	
0000 0100	Netherlands, Radio	6165na	9845na	
0000 0100	New Zealand, R New Zealand Int	17675pa		
0000 0100	New Zealand, ZLXA	3935do	7290do	
0000 0100 vl	Papua New Guinea, NBC	9675do	11880irr	
0000 0100	Singapore, SBC Radio One	6150do		
0000 0100 vl/as	Solomon Islands, SIBC	5020do		
0000 0100 vl/a	Solomon Islands, SIBC	9545do		
0000 0100	Spain, R Exterior Espana	15385na		
0000 0100	Ukraine, R Ukraine International	5905eu	7320as	9640as
0000 0100	USA, Armed Forces Radio	4278va	4319va	4993va
		6350va	6458va	6847va
		10940va	12579va	12689va
		13362va	16847va	13254va
0000 0100	USA, KAJ Dallas TX	13815va		
0000 0100	USA, KBNA Salt Lake City UT	15590na		
0000 0100	USA, KWHR Naalehu HI	17510as		
0000 0100 twhfa	USA, Voice of America	5995am	6130am	7405am
		9775am	11695am	13740am
0000 0100	USA, WBCQ Monticello ME	7415na	9335na	
0000 0100	USA, WEWN Birmingham AL	5825na	13615na	
0000 0100	USA, WHRA Greenbush ME	7580eu		
0000 0100	USA, WHRI Noblesville IN	5745va	7315am	
0000 0100	USA, WINB Red Lion PA	12160am		
0000 0100	USA, WJCR Upton KY	7490am	13595as	
0000 0100	USA, WRMI Miami FL	9955sa		
0000 0100	USA, WRNO New Orleans LA	7355va		
0000 0100	USA, WSHB Cypress Crk SC	7535am	9430am	15285sa
0000 0100	USA, WTJC Newport NC	9370na		
0000 0100 sm	USA, WWBS Macon GA	11910na		
0000 0100	USA, WWCR Nashville TN	5070na	7435na	9475na
0000 0100	USA, WWFV McCaysville GA	5085va	6890am	
0000 0100	USA, WYFR Okeechobee FL	6085na	9505na	
0000 0100 vl	Vanuatu, Radio	3945do	4960do	7260do
0000 0100	Zambia, Christian Voice	4965do		
0030 0100	Australia, Radio	9660pa	12080va	15240pa
		17580na	17750as	15415as
		21740va		17795va
0030 0100	Iran, VOIRI	9022am	9835am	11970am
0030 0100	Lithuania, Radio Vilnius	11690eu		
0030 0100	Sri Lanka, Sri Lanka BC Corp	4940do		
0030 0100	Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as
		15425as		9770as
0030 0100	Thailand, Radio	9655as	11905as	15395na
0030 0100	USA, VOA Special English	7215as	9770as	11760as
		15290as	17740as	17820as
0030 0100	USA, Voice of America	7215as	9770as	11760as
		15290as	17740as	15185as
0045 0100	Pakistan, Radio	11650as	15455as	
0050 0100	Italy, RAI International	9675na	11800na	
0050 0100	UK, International BC Tamil	11570as		

0100 UTC - 9PM E / 8PM C / 6PM P

0100 0110	Italy, RAI International	9675na	11800na	
0100 0115	Pakistan, Radio	11650as	15455as	
0100 0125	Netherlands, Radio	6165na	9845na	
0100 0127	Czech Rep, Radio Prague Intl	5915na	7345na	
0100 0127	Vietnam, Voice of	9525na		
0100 0130 s	Germany, Universal Life	9435as		
0100 0130	Hungary, Radio Budapest	9560na		
0100 0130	Iran, VOIRI	9022am	9835am	11970am
0100 0130	Slovakia, R Slovakia International	5930na	7230ca	9485sa
0100 0130 twhfa	USA, Voice of America	5995am	6130am	7405am
		9775am	13740am	9455am
0100 0130	Uzbekistan, Radio Tashkent	7190as	9375as	9530as
0100 0145	Germany, Deutsche Welle	6040na	11810na	13720am
0100 0156	North Korea, Voice of Korea	3560va	11734va	15230va
0100 0159	Canada, R Canada International	5960am	13670am	15170am
		15305am		
0100 0200	Anguilla, Caribbean Beacon	6090am		
0100 0200 vl	Australia, ABC/Katherine	5025do		
0100 0200	Australia, ABC/Tennant Creek	4910do		
0100 0200	Australia, Christian Voice	17775pa	21680pa	
0100 0200	Australia, Radio	9660pa	12080pa	15240as
		17580pa	17750as	15415as
		21725pa		
0100 0200	Canada, CBC Northern Service	9625do		
0100 0200	Canada, CFRX Toronto ON	6070do		
0100 0200	Canada, CFVP Calgary AB	6030do		
0100 0200	Canada, CHNX Halifax, NS	6130do		
0100 0200	Canada, CKZN St John's NF	6160do		
0100 0200	Canada, CKZU Vancouver BC	6160do		
0100 0200	China, China Radio International	9570na		
0100 0200	Costa Rica, R for Peace Intl	7455irr	15049va	
0100 0200	Costa Rica, University Network	5030am	6150am	7375am
		11870am	13749na	9724sa
0100 0200	Cuba, Radio Havana	6000na	9820na	11705na
0100 0200	Ecuador, HCJB	9745na	15115na	21455usb
0100 0200 a/monthly	Finland, Scandy Weekend Radio	11720va		
0100 0200	Guyana, Voice of	3289do	5949do	
0100 0200	Indonesia, Voice of	9525as	11784as	15149as
0100 0200	Japan, Radio	11860pa	11870me	11880me
		17685pa	17810as	17835sa
		17985pa		17845as
0100 0200	Malaysia, Radio	7295do		
0100 0200	Malaysia, RTM Kota Kinabalu	5980do		
0100 0200	Namibia, Namibian BC Corp	3270af	3289af	
0100 0200	New Zealand, R New Zealand Int	17675pa		
0100 0200	New Zealand, ZLXA	3935do	7290do	
0100 0200 vl	Papua New Guinea, NBC	9675do	11880irr	
0100 0200	Russia, Voice of Russia WS	9665na	9725na	11825na
		17595na		12000na
0100 0200	Singapore, SBC Radio One	6150do		
0100 0200	Solomon Islands, SIBC	5020do		
0100 0200	Solomon Islands, SIBC	9545do		
0100 0200	Spain, R Exterior Espana	15385na		
0100 0200	Switzerland, Swiss R International	9885am		
0100 0200	UK, BBC World Service	5965as	5975am	6175na
		9410as	9590am	9915sa
		12095sa	15280as	15310as
		17790as		
0100 0200	USA, Armed Forces Radio	4278va	4319va	4993va
		6350va	6458va	6847va
		10940va	12579va	12689va
		13362va	16847va	13254va
0100 0200	USA, KAJ Dallas TX	13815va		
0100 0200	USA, KJES Vado NM	7555na		
0100 0200	USA, KBNA Salt Lake City UT	7510na		
0100 0200	USA, KWHR Naalehu HI	17510as		
0100 0200	USA, Voice of America	7115as	9635as	11725as
		11820as	13650as	15250as
		17820as		
0100 0200 s twhfa	USA, WBCQ Monticello ME	9335na		
0100 0200	USA, WBCQ Monticello ME	7415na		
0100 0200	USA, WEWN Birmingham AL	5825na	13615na	
0100 0200	USA, WHRA Greenbush ME	7580eu		
0100 0200	USA, WHRI Noblesville IN	5745va	7315am	
0100 0200	USA, WINS Red Lion PA	12160am		
0100 0200	USA, WJCR Upton KY	7490am	13595as	
0100 0200	USA, WRMI Miami FL	7385na	13595as	
0100 0200	USA, WRNO New Orleans LA	7355va		
0100 0200	USA, WSHB Cypress Crk SC	7355na	9430am	15285sa
0100 0200	USA, WTJC Newport NC	9370na		
0100 0200	USA, WWCR Nashville TN	3215na	5070na	7435na
0100 0200	USA, WWFV McCaysville GA	5085va	5085am	13845na
0100 0200	USA, WYFR Okeechobee FL	6065na	9505na	15060as
0100 0200	Vanuatu, Radio	3945do	4960do	7260do
0100 0200 twhfa	Zambia, Christian Voice	4965do		
0100 0200 sm	Libya, Voice of Africa	11815af	15435af	17725af
0100 0200	Austria, R Austria International	9870na		
0100 0200	Sweden, Radio	13625as		
0100 0200	UK, RTE Radio	6155ca		
0100 0200 twhfa	USA, VOA Special English	9775am	7405am	13740am
0100 0200 twhfa	USA, Voice of America	5995am	6130am	9455am
0140 0200	Vatican, Vatican Radio	9650nu	12055au	
0145 0200	Albania, R Tirana International	6115na	7160na	

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0200 UTC - 10PM E / 9PM C / 7PM P

0200 0210 mtwhf	Greece, Voice of	7475va	9420va	11645va	12105va
0200 0230 sm w fa	Belarus, R Belarus International	6070eu	7210eu		
0200 0230	Myanmar, Radio	7185do			
0200 0230 a	UK, Wales Radio Intl/Merlin	9795na			
0200 0230	USA, KJES Vado NM	7555na			
0200 0230	USA, WINB Red Lion PA	12160am			
0200 0245	Germany, Deutsche Welle	11965as	13710as	15370as	
0200 0245	Iraq, Radio Iraq International	7157irr	9684irr	11785irr	
0200 0256	North Korea, Voice of Korea	11845va	13650va		
0200 0256	Romania, R Romania International	11940na	15105as	15180as	15340na
0200 0257	Canada, R Canada International	15260as	17860as		
0200 0300	Anguilla, Caribbean Beacon	6090am			
0200 0300 twhfa	Argentina, RAE	11710am			
0200 0300 vl	Australia, ABC/Alice Springs	4835do			
0200 0300 vl	Australia, ABC/Katherine	5025do			
0200 0300 vl	Australia, ABC/Tennant Creek	4910do			
0200 0300	Australia, Christian Voice	17775pa	21680pa		
0200 0300	Australia, Radio	9660pa	12080va	15240as	15415as
0200 0300	Bulgaria, Radio	15515va	17580va	17750as	21725va
0200 0300	Canada, CBC Northern Service	9400na	11700na		
0200 0300	Canada, CFRX Toronto ON	9625do			
0200 0300	Canada, CFVP Calgary AB	6070do			
0200 0300	Canada, CHNX Halifax, NS	6130do			
0200 0300	Canada, CKZN St John's NF	6160do			
0200 0300	Canada, CKZU Vancouver BC	6160do			
0200 0300	Costa Rica, R for Peace Intl	7455irr	15049va		
0200 0300	Costa Rica, University Network	5030am	6150am	7375am	9724sa
0200 0300	Cuba, Radio Havana	11870am	13749na	13749na	
0200 0300	Ecuador, HCJB	6000na	9820na	11705na	
0200 0300	Egypt, Radio Cairo	9745na	15115na	21455usb	
0200 0300 a/monthly	Finland, Scandv Weekend Radio	11720va			
0200 0300	Guyana, Voice of	3289do	5949do		
0200 0300	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0200 0300	Malaysia, Radio	7295do			
0200 0300	Malaysia, RTM Kota Kinabalu	5980do			
0200 0300	Namibia, Namibian BC Corp	3270af	3289af		
0200 0300	New Zealand, R New Zealand Int	17675pa			
0200 0300	New Zealand, ZLXA	3935do	7290do		
0200 0300 vl	Papua New Guinea, NBC	9675do	11880irr		
0200 0300	Russia, Voice of Russia WS	9665na	12000na	17595na	
0200 0300	Singapore, SBC Radio One	6150do			
0200 0300 vl/as	Solomon Islands, SIBC	5020do			
0200 0300 vl/a	Solomon Islands, SIBC	9545do			
0200 0300	South Korea, R Korea Intl	7275na	11725sa	11810sa	15575na
0200 0300	Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9770as
0200 0300	Taiwan, Radio Taipei International	5950na	9680na	11740am	11825pa
0200 0300	UK, BBC World Service	15345as			
0200 0300	UK, Merlin Network One	9430na			
0200 0300	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
0200 0300	USA, KAJI Dallas TX	6350va	6458va	6847va	10320va
0200 0300	USA, KBTN Salt Lake City UT	10940va	12579va	12689va	13254va
0200 0300	USA, KWHR Naalehu HI	13362va	16847va		
0200 0300	USA, Voice of America	5755va			
0200 0300	USA, WHRA Greenbush ME	7510na			
0200 0300	USA, WHRI Noblesville IN	17510as			
0200 0300	USA, WSHB Cypress Crk SC	7115as	9635as	11705as	11725as
0200 0300	USA, WTCB McCaysville GA	11820as	13650as	15250as	17740as
0200 0300	USA, WRML Miami FL	17820va			
0200 0300	USA, WRNO New Orleans LA	7355va			
0200 0300	USA, WSHB Cypress Crk SC	5850na	7535am	9430na	
0200 0300	USA, WTCJ Newport NC	9370na			
0200 0300	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0200 0300	USA, WVFY Okeechobee FL	5085na	5085am		
0200 0300	Zambia, Christian Voice	4965do			
0200 0300	Cambodia, National Radio Of	11940as			
0215 0220	Nepal, Radio	5005as	7165as		
0230 0257	Vietnam, Voice of	9525na			
0230 0300	Albania, R Tirana International	6115na	7160na		
0230 0300	Hungary, Radio Budapest	9570na			
0230 0300	Philippines, Radyo Pilipinas	11885pa	15120pa	15270pa	
0230 0300	Slovakia, Adventist World Radio	7235as			
0230 0300	Sweden, Radio	9495am	9755na		
0230 0300	Switzerland, Swiss R International	9885am			
0240 0247	Croatia, The Voice of Croatia	6165eu	7365eu	9830eu	9925sa
0250 0300	Vatican City, Vatican Radio	11870am			
0250 0300 vl	Zambia, National BC Corp	7305am	9605am		

0300 UTC - 11PM E / 10PM C / 8PM P

0300 0310	Vatican City, Vatican Radio	7305am	9605am		
0300 0327	Czech Rep, Radio Prague Intl	7345na	7385na	9870na	
0300 0330	Egypt, Radio Cairo	9475am			
0300 0330	S Africa, Channel Africa	6035af			
0300 0330 s twhfa	Thailand, Radio	9655am	11905am	15395na	
0300 0340	USA, WBCQ Monticello ME	9335na			
0300 0400	Germany, Deutsche Welle	9535na	9640na	13780am	15105na
0300 0400 vl	Anguilla, Caribbean Beacon	6090am			
0300 0400	Australia, ABC/Alice Springs	4835do			
0300 0400	Australia, ABC/Katherine	5025do			
0300 0400	Australia, ABC/Tennant Creek	4910do			
0300 0400	Australia, Christian Voice	17775pa	21680pa		
0300 0400	Australia, Radio	9660pa	12080va	15240as	15415as
0300 0400	Australia, Radio	15515va	17580va	17750as	21725va
0300 0400 mthwf	Bhutan, Bhutan BC Service	6035do			
0300 0400 vl	Botswana, Radio	3356do	4820do	7255do	
0300 0400	Canada, CBC Northern Service	9625do			
0300 0400	Canada, CFRX Toronto ON	6070do			
0300 0400	Canada, CFVP Calgary AB	6030do			
0300 0400	Canada, CHNX Halifax, NS	6130do			
0300 0400	Canada, CKZN St John's NF	6160do			
0300 0400	Canada, CKZU Vancouver BC	6160do			
0300 0400	China China Radio International	9690na			
0300 0400	Costa Rica, Faro del Caribe	5054ca	6175ca	9644ca	
0300 0400	Costa Rica, R for Peace Intl	7455irr	15049va		
0300 0400	Costa Rica, University Network	5030am	6150am	7375am	9724sa
0300 0400	Cuba, Radio Havana	6000na	9820na	11705na	
0300 0400 a/monthly	Finland, Scandv Weekend Radio	11720va			
0300 0400	Guatemala, Radio Cultural	3300do			
0300 0400	Guyana, Voice of	3289do	5949do		
0300 0400 sm	Honduras, Radio Luz y Vida	3250ca			
0300 0400	Japan, Radio	17825ca	21610pa		
0300 0400	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0300 0400	Lesotho, Radio	4800do			
0300 0400	Malaysia, Radio	7295do			
0300 0400	Malaysia, Voice of Islam	6175as	9750as	15295as	
0300 0400	Namibia, Namibian BC Corp	3270af	3289af		
0300 0400	New Zealand, R New Zealand Int	17675pa			
0300 0400	Oman, Radio Sultanate of	15355va			
0300 0400	Papua New Guinea, NBC	9675do	11880irr		
0300 0400	Philippines, Radyo Pilipinas	11885pa	15120pa	15270pa	
0300 0400	Russia, Voice of Russia WS	9665na	11750na	12000na	17565na
0300 0400	Singapore, SBC Radio One	6150do			
0300 0400	Solomon Islands, SIBC	5020do			
0300 0400	Solomon Islands, SIBC	9545do			
0300 0400	Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130do	9770as
0300 0400	Taiwan, Radio Taipei International	15425as			
0300 0400	Taiwan, Radio Taipei International	5950na	9680na	11745as	11825as
0300 0400	Turkey, Voice of	7270af	11655va	21715as	
0300 0400	Uganda, Radio	4976do	5026do		
0300 0400	UK, BBC World Service	3255af	5975am	6005pf	6135am
0300 0400	USA, KAJI Dallas TX	6175na	6190af	6195eu	7120af
0300 0400	USA, KTBN Salt Lake City UT	17100as	17205na	17310af	172035af
0300 0400	USA, KWHR Naalehu HI	15420af	15575me	15630as	17760as
0300 0400	USA, Voice of America	21660as	21830as		
0300 0400	Ukraine, R Ukraine International	7320as	7410eu	9640as	12040as
0300 0400	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
0300 0400	USA, KAJI Dallas TX	6350va	6458va	6847va	10320va
0300 0400	USA, KTBN Salt Lake City UT	10940va	12579va	12689va	13254va
0300 0400	USA, KWHR Naalehu HI	13362va	16847va		
0300 0400	USA, Voice of America	5755va			
0300 0400	USA, WBCQ Monticello ME	7415na			
0300 0400	USA, WEWN Birmingham AL	5825na			
0300 0400	USA, WHRA Greenbush ME	7580eu			
0300 0400	USA, WHRI Noblesville IN	5745va	7315am		
0300 0400	USA, WIBN, Red Lion PA	12160am			
0300 0400	USA, WJCR Upton KY	7490am			
0300 0400	USA, WMLK Bethel PA	9465eu			
0300 0400	USA, WRMF Miami FL	7385na			
0300 0400	USA, WRNO New Orleans LA	7395am			
0300 0400	USA, WSHB Cypress Crk SC	5850na	11930eu		
0300 0400	USA, WTCJ Newport NC	9370na			
0300 0400	USA, WWCR Nashville TN	3215na	5070na	5070na	5935na
0300 0400	USA, WWFV McCaysville GA	5085na	5085am		
0300 0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300 0400	Vatican City, Vatican Radio	13595as			
0300 0400	Zambia, Christian Voice	6065do			
0300 0400	Zambia, National BC Corp	6165do			
0300 0400	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0310 0315	Vatican City, Vatican Radio	7305am	9605am	9660af	
0315 0340	Vatican City, Vatican Radio	9660af			
0325 0358	Honduras, Radio Litoral	4832irr			
0330 0345	Libya, Voice of Africa	11815af	15435af	17725af	
0330 0357	Czech Rep, Radio Prague Intl	11600as	15470as		
0330 0357	Vietnam, Voice of	9795na			
0330 0400	Austria, AWR Europe	17635as			
0330 0400	Myanmar, Radio	9730do			
0330 0400	Sweden, Radio	11895na			

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0330 0400	UAE, Radio Dubai	11725na	12005na	13675na	15400na
0330 0400	twhfa	USA, WBCQ Monticello ME	9335na		
0345 0400	f	Seychelles, FEBA Radio	11885af		

0400 UTC - 12AM E / 11PM C / 9PM P

0400 0405	USA, WWCR Nashville TN	5070na	5935na	7435na	
0400 0405	sm	USA, WWCR Nashville TN	3210na		
0400 0405	twhfa	USA, WWCR Nashville TN	3215na		
0400 0415	Israel, Kol Israel	9435va	15640va	17545va	
0400 0430	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580pa	21725pa	
0400 0430	as	Australia, Radio	17750as		
0400 0430	Belgium, RVI Flanders R Intl	15595na			
0400 0430	France R France International	9550af	15155af		
0400 0430	s twhfa	Mexico, R Mexico International	9705am	11770am	
0400 0430	Nigeria, Radio/Kaduna	6090da	7275da		
0400 0430	S Africa, Channel Africa	5955af			
0400 0430	Sri Lanka, Sri Lanka BC Corp	6005as	6075as	6130da	9770as
0400 0430	Switzerland, Swiss R International	9610eu	9885am		
0400 0430	USA, WRMI Miami FL	7385na			
0400 0445	Germany, Deutsche Welle	7225af	9565af	9765af	13690af
0400 0445	USA, WYFR Okeechobee FL	6065na	9355eu	9505na	
0400 0456	China China Radio International	9560na	9730na		
0400 0456	Romania, R Romania International	11940na	15365na	15365na	17735as
		21480as			
0400 0500	Anguilla, Caribbean Beacon	6090am			
0400 0500	Australia, ABC/Alice Springs	4835da			
0400 0500	vl	Australia, ABC/Katherine	5025da		
0400 0500	vl	Australia, ABC/Tennant Creek	4910da		
0400 0500	Australia, Christian Voice	21680pa			
0400 0500	Botswana, Radio	3356da	4820da	7255da	
0400 0500	Canada, CBC Northern Service	9625da			
0400 0500	Canada, CFRX Toronto ON	6070da			
0400 0500	Canada, CFVP Calgary AB	6030da			
0400 0500	Canada, CHNX Halifax, NS	6130da			
0400 0500	Canada, CKZN St John's NF	6160da			
0400 0500	Canada, CKZU Vancouver BC	6160da			
0400 0500	Costa Rica, R for Peace Intl	7455irr	15049va		
0400 0500	Costa Rica, University Network	5030am	6150am	7375am	9724sa
		11870am	13749na	17645as	
0400 0500	Cuba, Radio Havana	6000na	9820na	11705na	
0400 0500	Ecuador, HCJB	9745na	15115na	21455usb	
0400 0500	a/monthly	Finland, Scandv Weekend Radio	11720va		
0400 0500	Guatemala, Radio Cultural	3300da	5955da		
0400 0500	Guyana, Voice of	3289da	5949da		
0400 0500	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0400 0500	Lesotho, Radio	4800da			
0400 0500	Malaysia, Radio	7295da			
0400 0500	Malaysia, Voice of Islam	6175as	9750as	15295as	
0400 0500	Myanmar, Radio	9730da			
0400 0500	Namibia, Namibian BC Corp	3270af	3289af		
0400 0500	New Zealand, R New Zealand Int	17675pa			
0400 0500	New Zealand, ZLXA	3935da	7290da		
0400 0500	Nigeria, Radio/Enugu	6025da			
0400 0500	Papua New Guinea, NBC	9675da	11880irr		
0400 0500	Russia, Voice of Russia WS	9665na	11750na	12000na	17565na
		17650na	17690na		
0400 0500	Singapore, SBC Radio One	6150da			
0400 0500	vl/as	Solomon Islands, SIBC	5020da		
0400 0500	vl/a	Solomon Islands, SIBC	9545da		
0400 0500	Uganda, Radio	4976da	5026da		
0400 0500	UK, BBC World Service	3255af	5975am	6005af	6135me
		6175na	6190af	6195eu	7120af
		7160af	9410eu	12035eu	12095me
		15280as	15310as	15420af	15575me
		17640af	17760as	17790as	21660as
		21830as			
0400 0500	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
		6350va	6458va	6847va	10320va
		10940va	12579va	12689va	13254va
		13362va	16847va		
0400 0500	USA, KAIJ Dallas TX	5755va			
0400 0500	USA, KTBN Salt Lake City UT	7510na			
0400 0500	USA, KWHR Naalehu HI	17780as			
0400 0500	USA, Voice of America	4960af	5855af	6080af	7275af
		7290af	9530va	9575af	11965me
		15205va	17895af		
0400 0500	USA, WBCQ Monticello ME	7415na			
0400 0500	USA, WEWN Birmingham AL	5825na			
0400 0500	USA, WHRA Greenbush ME	7580eu			
0400 0500	USA, WHRI Noblesville IN	5745va	7315am		
0400 0500	USA, WJCR Upton KY	7490am	13595as		
0400 0500	USA, WMLK Bethel PA	9465eu			
0400 0500	USA, WSHB Cypress Crk SC	11930eu	15195af		
0400 0500	USA, WTJC Newport NC	9370na			
0400 0500	USA, WWFV McCaysville GA	5085va	5085am		
0400 0500	Zambia, Christian Voice	6065da			
0400 0500	Zambia, National BC Corp	6165da	6265da		
0400 0500	Zimbabwe, Zimbabwe BC Corp	4828da	6045da		
0405 0500	USA, WWCR Nashville TN	3210na	5070na	5935na	7435na
0425 0440	Italy, RAI International	5975af	7150af		
0427 0525	Liberia, Voice of Hope	12060af	15320af		
0430 0500	Australia, Radio	9660pa	12080pa	15240as	15415as
		15515va	17580pa	17580as	21725pa
0430 0500	Italy, Italian Radio Relay Service	3985va			
0430 0500	Netherlands, Radio	6165na	9590na		
0430 0500	Nigeria, Radio/Ibadan	6050da			

0430 0500	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0430 0500	vl	Nigeria, Radio/Lagos	3326do	4990do		
0430 0500	vl	S Africa, Adv World Radio Africa	11975af			
0430 0500	mtwhfa	Sri Lanka, Sri Lanka BC Corp	6130do			
0430 0500	mtwhfa	Swaziland, Trans World Radio	3200af			
0430 0500	s twhfa	Switzerland, Swiss R International	9885am			
0430 0500	s twhfa	USA, WRMI Miami FL	7385na			
0430 0500	vl	Yugoslavia, Radio	11870na			
0445 0500	vl	USA, WYFR Okeechobee FL	9355eu			

0500 UTC - 1AM E / 12AM C / 10PM P

0500 0504	vl	Pakistan, Radio	15185me	17825me	21460me	
0500 0515	vl	Canada, CBC Northern Service	9625do			
0500 0515	s hfa	USA, KVOH Los Angeles CA	9975na			
0500 0520	vl	Vatican City, Vatican Radio	4005eu	5885eu	7250eu	9660af
0500 0520	vl	11625af	15570af			
0500 0530	as	Australia, Radio	17750as			
0500 0530	as	Canada, R Canada International	6145eu	7290eu	9595eu	11710eu
0500 0530	as	France R France International	13755af	15330af		
0500 0530	s twhfa	Mexico, R Mexico International	11710af	17800af		
0500 0530	s twhfa	Netherlands, Radio	6165na	9845na		
0500 0530	s twhfa	S Africa, Adv World Radio Africa	5960af	6015af		
0500 0530	s twhfa	S Africa, Channel Africa	11720af			
0500 0530	s twhfa	Switzerland, Swiss R International	9610eu			
0500 0530	vl	Uganda, Radio	4976do	5026do		
0500 0530	vl	UK, BBC World Service	5975am	6005af	6175am	6190af
0500 0530	vl	6195eu	7160af	9410eu	9740as	
0500 0530	vl	11760me	11765af	11940af	11955pa	
0500 0530	vl	12095eu	15280as	15310as	15360as	
0500 0530	vl	15420af	15575as	17640af	17760as	
0500 0530	vl	17790as	17885af	21660as		
0500 0530	s twhfa	USA, WRMi Miami FL	7385na			
0500 0530	s twhfa	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		
0500 0545	vl	Germany, Deutsche Welle	9690na	9785na	11985na	
0500 0600	vl	Anguilla, Caribbean Beacon	6090am			
0500 0600	vl	Australia, ABC/Alice Springs	4835do			
0500 0600	vl	Australia, ABC/Katherine	5025do			
0500 0600	vl	Australia, ABC/Tennant Creek	4910da			
0500 0600	vl	Australia, Christian Voice	21680pa			
0500 0600	vl	Botswana, Radio	3356do	4820do	7255do	
0500 0600	vl	Canada, CFRX Toronto ON	6070da			
0500 0600	vl	Canada, CFVP Calgary AB	6030da			
0500 0600	vl	Canada, CHNX Halifax, NS	6130da			
0500 0600	vl	Canada, CKZN St John's NF	6160da			
0500 0600	vl	Canada, CKZU Vancouver BC	6160da			
0500 0600	vl	Costa Rica, R for Peace Intl	7455irr	15049va		
0500 0600	vl	Costa Rica, University Network	5030am	6150am	7375am	9724sa
0500 0600	vl	11870am	13749na	17645as		
0500 0600	vl	19550na	21455usb			
0500 0600	vl	Cuba, Radio Havana	9550na	9820na	9830na	
0500 0600	vl	Ecuador, HCJB	9745na	15115na	21455usb	
0500 0600	vl	Finland, Scandv Weekend Radio	11720va			
0500 0600	vl	Guyana, Voice of	3289da	5949do		
0500 0600	vl	Italy, Italian Radio Relay Service	3985va			
0500 0600	vl	Japan, Radio	5975eu	6110na	7230eu	11715as
0500 0600	vl	11760as	13630na	15195as	17810pa	
0500 0600	vl	21755pa				
0500 0600	vl	Kenya, Kenya BC Corp	4885irr	4915rr	4885irr	
0500 0600	vl	Kuwait, Radio	15110as			
0500 0600	vl	Lesotho, Radio	4800do			
0500 0600	vl	Liberia, R Liberia International	5100do			
0500 0600	vl	Malaysia, Radio	7295do			
0500 0600	vl	Malaysia, RTM Sarawak	7160da			
0500 0600	vl	Malaysia, Voice of Islam	6175as	9750as	15295as	
0500 0600	vl	Myanmar, Radio	9730do			
0500 0600	vl	Namibia, Namibian BC Corp	3270af	3289af		
0500 0600	vl	New Zealand, R New Zealand Int	11725pa			
0500 0600	vl	New Zealand, ZLXA	3935da			
0500 0600	vl	Nigeria, Radio/Enugu	6025da			
0500 0600	vl	Nigeria, Radio/Ibadan	6050da			
0500 0600	vl	Nigeria, Radio/Kaduna	4770da	6090do	7275do	9570do
0500 0600	vl	Nigeria, Radio/Lagos	3326do	4990do		
0500 0600	vl	Nigeria, Voice of	7255af	15120af		
0500 0600	vl	Papua New Guinea, NBC	9675do	11880irr		
0500 0600	vl	Russia, Voice of Russia WS	17635au	17685au	21790au	
0500 0600	vl	Singapore, SBC Radio One	6150da			
0500 0600	vl	Solomon Islands, SIBC	5020da			
0500 0600	vl	Spain, R Exterior Espana	6055na			
0500 0600	vl	Sri Lanka, Sri Lanka BC Corp	6130da			
0500 0600	vl	Swaziland, Trans World Radio	4775af	6035af	9500af	</td

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0500 0600	USA, WTJC Newport NC	9370na			
0500 0600	USA, WVCR Nashville TN	3210na	5070na	5935na	7435na
0500 0600	USA, WYFR Okeechobee FL	5985na	9355eu	11580eu	
0500 0600 vl	Vanuatu, Radio	3945do	4960do	7260do	
0500 0600	Zambia, Christian Voice	6065do			
0500 0600 vl	Zambia, National BC Corp	6165do	6265do		
0515 0530 h a	USA, KVOH Los Angeles CA	9975na			
0520 0530	Vatican City, Vatican Radio	9660af	11625af	15570af	
0525 0600 vl	Ghana, Ghana BC Corp	3366do	4915do		
0530 0540 vl	Cameroun, CRTV Radio Buea	6005do			
0530 0545 ma	USA, KVOH Los Angeles CA	9975na			
0530 0559	Canada, R Canada International	13755af	15330af	17740af	
0530 0600	Australia, Radio	9660pa	12080va	15240pa	15515va
		17580pa	17750as	21725pa	
0530 0600	Georgia, Georgian Radio	11805eu			
0530 0600	S Africa, Adv World Radio Africa	11970af			
0530 0600	Thailand, Radio	9655eu	11905eu	21795eu	
0530 0600	UAE, Radio Dubai	13675au	15435au	17830au	21700au
0530 0600 smtwhf	UK, BBC World Service	17885af			
0530 0600 vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
0532 0600	Austria, R Austria International	6155eu	13730eu		
0545 0600 ma	USA, KVOH Los Angeles CA	9975na			

0600 UTC - 2AM E / 1AM C / 11PM P

0600 0615	S Africa, Trans World Radio	11640af			
0600 0615	USA, WBCQ Monticello ME	7415na			
0600 0630	France, R France International	11710af	17800af	21620as	
0600 0630 mtwhf	Malta, Voice of Mediterranean	6110eu			
0600 0630	S Africa, Channel Africa	15215af			
0600 0630	USA, Voice of America	5970af	6035af	6080af	7195af
		9530va	9680af	11805af	11965me
		11995af	12080af	13670af	15205va
0600 0641	Romania, R Romania International	11940na	15180na		
0600 0645	Germany, Deutsche Welle	6140eu	11925af	13790af	17860af
0600 0700	Anguilla, Caribbean Beacon	6090am			
0600 0700 vl	Australia, ABC/Alice Springs	4835do			
0600 0700 vl	Australia, ABC/Katherine	5025do			
0600 0700 vl	Australia, ABC/Tennant Creek	4910do			
0600 0700	Australia, Christian Voice	21680pa			
0600 0700	Australia, Radio	9660pa	12080pa	15240pa	15415as
		15515va	17580pa	17750as	21725pa
0600 0700 vl	Botswana, Radio	7255do	9600do	7255do	
0600 0700	Canada, CFRX Toronto ON	6070do			
0600 0700	Canada, CFVP Calgary AB	6030do			
0600 0700	Canada, CHNX Halifax, NS	6130do			
0600 0700	Canada, CKZN St John's NF	6160do			
0600 0700	Canada, CKZU Vancouver BC	6160do			
0600 0700	Costa Rica, R for Peace Intl	7455irr	15049va		
0600 0700	Costa Rica, University Network	5030am	6150am	7375am	9724sa
		11870am	13749na	17645as	
0600 0700	Cuba, Radio Havana	9550na	9820na	9830na	
0600 0700	Ecuador, HCJB	9745na	11680eu	15115na	21455usb
0600 0700 a/monthly	Finland, Scandv Weekend Radio	11690va			
0600 0700	Germany, Overcomer Ministries	9430pa	13810au		
0600 0700 vl	Ghana, Ghana BC Corp	3366do	4915do		
0600 0700	Guyana, Voice of	3289do	5949do		
0600 0700 mtwhf/vl	Italy, Italian Radio Relay Service	7120va			
0600 0700	Japan, Radio	7230eu	11740pa	13630pa	15195as
		17870pa	21755pa		
0600 0700	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0600 0700	Kuwait, Radio	15110as			
0600 0700 vl	Lesotho, Radio	4800do			
0600 0700 vl	Liberia, ELWA	4760do			
0600 0700 vl	Liberia, R Liberia International	5100do			
0600 0700	Malaysia, Radio	7295do			
0600 0700	Malaysia, RTM Sarawak	7160do			
0600 0700	Malaysia, Voice of	6175as	9750as	15295as	
0600 0700	Myanmar, Radio	9730do			
0600 0700	Namibia, Namibian BC Corp	3270af	3289af		
0600 0700	New Zealand, R New Zealand Int	11725pa			
0600 0700	New Zealand, ZLXA	3935do	7290do		
0600 0700 vl	Nigeria, Radio/Enugu	6025do			
0600 0700 vl	Nigeria, Radio/Ibadan	6050do			
0600 0700 vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0600 0700 vl	Nigeria, Radio/Lagos	3326do	4990do		
0600 0700 vl	Nigeria, Voice of	7255af	15120af		
0600 0700 vl	Papua New Guinea, NBC	9675do	11880irr		
0600 0700	Russia, Voice of Russia WS	15490au	17635au	17685au	21790au
0600 0700	Sierra Leone, Sierra Leone BS	3316do			
0600 0700	Singapore, SBC Radio One	6150do			
0600 0700 vl	Solomon Islands, SIBC	5020do	9545do		
0600 0700	Sri Lanka, Sri Lanka BC Corp	6130do			
0600 0700	Swaziland, Trans World Radio	4775af	6035af	9500af	
0600 0700	Uganda, Radio	5026do	7110do	7196do	
0600 0700	UK, BBC World Service	6055do	6175am	6190af	6195eu
		11760me	11765af	11940af	11955pa
		12095eu	15310as	15360as	15485eu
		15565eu	17640af	17760as	17790as
		21660as			
0600 0700 os	UK, BBC World Service	17885af			
0600 0700	USA, Armed Forces Radio	4278va	4319va	4993va	5765va
		6350va	6458va	6847va	10320va
		10940va	12579va	12689va	13254va
		13362va	16847va		
0600 0700	USA, KA1 Dallas TX	5755va			
0600 0700	USA, KTBN Salt Lake City UT	7510na			
0600 0700	USA, KWHR Naalehu HI	11565pa	17780as		

0600 0700	USA, WHRA Greenbush ME	11730af			
0600 0700	USA, WHRI Noblesville IN	5745va	7315am		
0600 0700	USA, WJCR Upton KY	7490am	13595as		
0600 0700	USA, WMLK Bethel PA	9465eu			
0600 0700	USA, WRNO New Orleans LA	7395am			
0600 0700	USA, WSHB Cypress Crk SC	11615af	13650af		
0600 0700	USA, WTJC Newport NC	9370na			
0600 0700	USA, WWCR Nashville TN	3210na			
0600 0700	Vanuatu, Radio	5985na			
0600 0700	Yemen, Rep of Yemen Radio	9780me			
0600 0700	Zambia, Christian Voice	9865do			
0600 0700 vl	Zambia, National BC Corp	6165do	6265do		
0600 0700 vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do		
0605 0610 mtwhf	Croatia, The Voice of Croatia	6165eu	7365eu	9830eu	9925sa
0610 0615 mtwhf	Vatican City, Vatican Radio	4050eu	5885eu	7250eu	9645eu
0610 0620 mtwhf	Greece, Voice of	9420eu	11900au	15630eu	17520pa
0630 0640 vl	Cameroon, CRTV Radio Buea	6005do			
0630 0700	Finland, YLE/Radio Finland	15315va	21670va		
0630 0700 t h	Georgia, Georgian Radio	6080me			
0630 0700	USA, Voice of America	9530va	9680af	11805af	11965me
0630 0700 as	USA, Voice of America	5970af	6035af	6080af	7195af
0630 0700	Vatican City, Vatican Radio	11995af	12080af	13670af	
0641 0656	Romania, R Romania International	11775eu	11940na	15180na	15365eu
0645 0655 as	Monaco, Trans World Radio	9870eu			
0645 0700	Germany, Deutsche Welle	6140eu			
0655 0700	Monaco, Trans World Radio	9870eu			
0700 0720	Swaziland, Trans World Radio	4775af	6035af	9500af	
0700 0727	Czech Rep, Radio Prague Intl	9880eu	11600eu		
0700 0730	Belgium, RVI Flanders R Intl	9865eu			
0700 0730 vl	Papua New Guinea, NBC	9675do	11880irr		
0700 0730	Slovakia, R Slovakia International	9440au	15460au	17550au	
0700 0730 as	UK, BBC World Service	17885af			
0700 0730 a	USA, Voice of America	6873va			
0700 0756	Romania, R Romania International	17735pa			
0700 0800	Anguilla, Caribbean Beacon	6090am			
0700 0800 vl	Australia, ABC/Alice Springs	4835do			
0700 0800 vl	Australia, ABC/Katherine	5025do			
0700 0800 vl	Australia, ABC/Tennant Creek	4910do			
0700 0800	Australia, Christian Voice	17870as	21680pa		
0700 0800	Australia, Radio	9660pa	12080va	15240va	15415as
0700 0800	Botswana, Radio	7255do	9600do	7255do	
0700 0800	Canada, CFRX Toronto ON	6070do			
0700 0800	Canada, CFVP Calgary AB	6030do			
0700 0800	Canada, CHNX Halifax, NS	6130do			
0700 0800	Canada, CKZN St John's NF	6160do			
0700 0800	Canada, CKZU Vancouver BC	6160do			
0700 0800	Costa Rica, R for Peace Intl	7455irr	15049va		
0700 0800	Costa Rica, University Network	5030am	6150am	6150am	7375am
		11870am	13749na	17645as	9724sa
0700 0800	Ecuador, HCJB	11680eu	11755pa	21455usb	
0700 0800 mtwhf	Egypt, Guinea, Radio Africa	15185af			
0700 0800 as/vl	Egypt, Guinea, Radio East Africa	15185af			
0700 0800 a/monthly	Finland, Scandv Weekend Radio	11690va			
0700 0800	France, R France International	15605af			
0700 0800	Germany, Deutsche Welle	6140eu			
0700 0800 as	Germany, Overcomer Ministries	9430pa	13810au		
0700 0800	Germany, Trans World Radio	12070eu			
0700 0800	Germany, Voice of Hope	5975eu	21590me		
0700 0800	Ghana, Ghana BC Corp	3366do	4915do		
0700 0800	Ghana, Ghana BC Corp	3366do	4915do		
0700 0800	Guyana, Voice of	3289do	5949do		
0700 0800 as/vl	Italy, Italian Radio Relay Service	7120va			
0700 0800	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
0700 0800	Kuwait, Radio	15110as			
0700 0800	Lesotho, Radio	4800do			
0700 0800	Liberia, ELWA	4760do			
0700 0800	Liberia, R Liberia International	5100do			
0700 0800	Malaysia, Radio	7295do			
0700 0800	Malaysia, RTM Sarawak	7160do			
0700 0800	Malaysia, Voice of	6275as	9750as	15295as	
0700 0800	Monaco, Trans World Radio	9870eu			
0700 0800	Myanmar, Radio	9730do			
0700 0800	Namibia, Namibian BC Corp	3270af	3289af		
0700 0800	New Zealand, R New Zealand Int	9885pa			
0700 0800	New Zealand, ZLXA	3935do	7290do		
0700 0800	Nigeria, Radio/Enugu	6025do			
0700 0800	Nigeria, Radio/Ibadan	6050do			
0700 0800	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
0700 0800	Nigeria, Radio/Lagos	3326do	4990do		
0700 0800	Russia, Voice of Russia WS	15490au	17495au	17525au	17635au
		17685au			
0700 0800	Sierra Leone, Sierra Leone BS	3316do			
0700 0800	Singapore, SBC Radio One	6150do			
0700 0800	Solomon Islands, SIBC	5020do			
0700 0800	Sri Lanka, Sri Lanka BC Corp	6130do			
0700 0800	Taiwan, Radio Taipei International	9590na			
0700 0800	Uganda, Radio	5026do	7110do	7110do	7196do
0700 0800	UK, BBC World Service	6175na	6190af	9410eu	9580pa

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0700 0800	USA, Armed Forces Radio	9740as 11955pa 15400f 17640eu 21660as	11760me 12095eu 15485eu 17760as	11765af 15310as 15565eu 17790as	11940af 15360as 15575as 17830af	0800 0900 as	UK, BBC World Service USA, Armed Forces Radio	15575as 4278va 6350va 10940va 13362va	4319va 4993va 6458va 12579va 16847va	5765va 4993va 6847va 10320va 13254va
0700 0800	USA, KAIJ Dallas TX	4278va 6350va 10940va 13362va	4319va 6458va 12579va 16847va	5765va 11765as 12579va 16847va	5755va 11765as 12579va 16847va	0800 0900	USA, KAIJ Dallas TX	5755va	4319va 6458va 12579va 16847va	4993va 5765va 10320va 13254va
0700 0800	USA, KBTN Salt Lake City UT	5755va	5755va	5755va	5755va	0800 0900	USA, KNLS Anchor Point AK	11765as	11765as	11765as
0700 0800	USA, KWHR Nadehu HI	7510na	7510na	7510na	7510na	0800 0900	USA, KTBN Salt Lake City UT	7510na	7510na	7510na
0700 0800	USA, WEWN Birmingham AL	11565pa	11565pa	11565pa	11565pa	0800 0900	USA, KWHR Nadehu HI	11565pa	11565pa	11565pa
0700 0800	USA, WHRA Greenbush ME	5825na	5825na	5825na	5825na	0800 0900	USA, Voice of America	11930as	11930as	11930as
0700 0800	USA, WHRI Noblesville IN	11730af	11730af	11730af	11730af	0800 0900	USA, WENV Birmingham AL	5825na	5825na	5825na
0700 0800	USA, WJCR Upton KY	5745va	7315am	5745va	7315am	0800 0900	USA, WHRA Greenbush ME	11730af	11730af	11730af
0700 0800	USA, WMLK Bethel PA	7490am	13595as	7490am	13595as	0800 0900	USA, WHRI Noblesville IN	5745va	5745va	5745va
0700 0800	USA, WRNO New Orleans LA	7395am	7395am	7395am	7395am	0800 0900	USA, WJCR Upton KY	7315am	7315am	7315am
0700 0800	USA, WSHB Cypress Crk SC	11615af	13650af	11615af	13650af	0800 0900	USA, WRNO New Orleans LA	7490am	7490am	7490am
0700 0800	USA, WTJC Newport NC	9370na	9370na	9370na	9370na	0800 0900	USA, WSHB Cypress Crk SC	13595as	13595as	13595as
0700 0800	USA, WWCR Nashville TN	3210na	5070na	5935na	7435na	0800 0900	USA, WWR New Orleans LA	9845au	9860eu	11615eu
0700 0800	USA, WYFR Okeechobee FL	7355eu	13695af	15170af	15170af	0800 0900	USA, WWR New Orleans LA	9845au	9860eu	11615eu
0700 0800 vl	Vanuatu, Radio	3945do	4960do	7260do	7260do	0800 0900	USA, WWCR Nashville TN	3210na	5070na	5935na
0700 0800	Zambia, Christian Voice	9865do	9865do	9865do	9865do	0800 0900	Vanuatu, Radio	3945do	4960do	7260do
0700 0800 vl	Zambia, National BC Corp	6165do	6265do	6165do	6265do	0800 0900	Zambia, Christian Voice	9865do	9865do	9865do
0700 0800 vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do	5975do	6045do	0800 0900	Zambia, National BC Corp	6165do	6265do	6265do
0705 0710 s	Croatia, The Voice of Croatia	6165eu	7365eu	9830eu	13830eu	0810 0830 s	Zimbabwe, Zimbabwe BC Corp	5975do	6045do	6045do
0715 0800	Guam, KTWR/ Trans World R	15200as	15200as	15200as	15200as	0815 0900	Armenia, Voice of	4810eu	15270eu	15270eu
0720 0735 mtwhf	Swaziland, Trans World Radio	4775af	6035af	9500af	9500af	0830 0900	Guam, KTWR/ Trans World R	15200as	15200as	15200as
0730 0800	Georgia, Georgian Radio	11910eu	11910eu	11910eu	11910eu	0830 0900	Seychelles, FEBA Radio	15330as	15330as	15330as
0730 0800 vl	Papua New Guinea, NBC	4890do	9675irr	4890do	9675irr	0830 0900	Australia, ABC/Alice Springs	15460as	15460as	15460as
0730 0800	Switzerland, Swiss R International	15545af	17685af	21750af	21750af	0830 0900	Australia, ABC/Katherine	2310do	2310do	2310do
0730 0800 as	UK, BBC World Service	15575as	17885af	1940eu	1940eu	0830 0900	Australia, ABC/Tennant Creek	2485do	2485do	2485do
0750 0755 as	Greece, Voice of	9420eu	11900au	15630eu	17520as	0830 0900	Australia, Radio	2325do	2325do	2325do
0755 0800 mtwhf	Germany, Trans World Radio	21530as	21530as	21530as	21530as	0830 0900	Australia, Radio	5995pa	9710pa	12080va
		12070eu	12070eu	12070eu	12070eu	0830 0900	Austria, AWR Europe	12080va	12080va	13605pa
						0830 0900	Georgia, Georgian Radio	11910me	11910me	11910me
						0830 0900	Italy/Adv World Radio Europe	9610eu	9610eu	9610eu
						0830 0900	Lithuania, Radio Vilnius	9710eu	9710eu	9710eu
						0830 0900	Switzerland, Swiss R International	21770af	21770af	21770af
						0855 0900 s	Taiwan, CBS	11725as	11725as	11725as

0800 UTC - 4AM E / 3AM C / 1AM P

0800 0804	Pakistan, Radio	17520eu	21465eu							
0800 0815	Guam, KTWR/ Trans World R	15200as	15200as							
0800 0820	Monaco, Trans World Radio	9870eu	9870eu							
0800 0825	Malaysia, Voice of	6275as	9750as	15295as						
0800 0830 vl	Australia, ABC/Alice Springs	4835do	5025do	5025do						
0800 0830 vl	Australia, ABC/Katherine	4910do	5925pa	5925pa						
0800 0830 vl	Australia, ABC/Tennant Creek	5995pa	61545as	12080va	13605pa					
0800 0830	Australia, Radio	15240va	15415as	21725pa						
0800 0830	Myanmar, Radio	9730do	9730do							
0800 0900	Anguilla, Caribbean Beacon	6090am	6090am							
0800 0900	Australia, Christian Voice	17820as	21680pa							
0800 0900 mtwhf	Bhutan, Bhutan BC Service	6035do	7255do	9600do	7255do					
0800 0900 vl	Botswana, Radio	6070do	6070do	6070do	6070do					
0800 0900	Canada, CFRX Toronto ON	6030do	6030do	6030do	6030do					
0800 0900	Canada, CFVP Calgary AB	6130do	6130do	6130do	6130do					
0800 0900	Canada, CHNX Halifax, NS	6160do	6160do	6160do	6160do					
0800 0900	Canada, CKZN St John's NF	6160do	6160do	6160do	6160do					
0800 0900	Canada, CKZU Vancouver BC	6160do	6160do	6160do	6160do					
0800 0900	Costa Rica, R for Peace Intl	7455irr	15049va	15149pa	15149pa					
0800 0900	Costa Rica, University Network	5030am	6150am	7375am	9724sa					
0800 0900	Ecuador, HCJB	11755pa	21455usb							
0800 0900 mtwhf	Egypt, Guinea, Radio Africa	15185af	15185af							
0800 0900 as/vl	Egypt, Guinea, Radio East Africa	15185af	15185af							
0800 0900 a/monthly	Finland, Scandv Weekend Radio	11690va	11690va							
0800 0900	Germany, Deutsche Welle	6140eu	6140eu							
0800 0900	Germany, Overcomer Ministries	13800pa	13810au							
0800 0900	Germany, Trans World Radio	12070eu	12070eu							
0800 0900	Germany, Voice of Hope	5975eu	21590me							
0800 0900 vl	Ghana, Ghana BC Corp	3366do	4915do							
0800 0900	Guyana, Voice of	3289do	5949do							
0800 0900	Indonesia, Voice of	9525pa	11784pa	15149pa						
0800 0900 as/vl	Italy, Italian Radio Relay Service	7120va	7120va							
0800 0900	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr						
0800 0900 vl	Lesotho, Radio	4800do	4800do							
0800 0900 vl	Liberia, ELWA	4760do	4760do							
0800 0900 vl	Liberia, R Liberia International	5100do	7295do							
0800 0900	Malaysia, Radio	11770eu	11770eu							
0800 0900 s	Malta, Voice of Mediterranean	7165af	7215af							
0800 0900	Namibia, Namibian BC Corp	7165af	7215af							
0800 0900	New Zealand, R New Zealand Int	9885pa	9885pa							
0800 0900	New Zealand, ZLXA	3935do	7290do							
0800 0900 vl	Nigeria, Radio/Enugu	6025do	6025do							
0800 0900 vl	Nigeria, Radio/Ibadan	6050do	6050do							
0800 0900 vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do					
0800 0900 vl	Nigeria, Radio/Lagos	3326do	4990do							
0800 0900 vl	Papua New Guinea, NBC	4890do	9675irr							
0800 0900	Russia, Voice of Russia WS	15490au	17495au	17525au	17635au					
		17685au	17685au	17685au	17685au					
0800 0900 s	S Africa, Amateur Radio League	9750af	21560af							
0800 0900	Sierra Leone, Sierra Leone BS	3316do	3316do							
0800 0900	Singapore, SBC Radio One	6150do	6150do							
0800 0900 vl	Solomon Islands, SIBC	5020do	5020do							
0800 0900	South Korea, R Korea Intl	9570om	13670eu							
0800 0900	Sri Lanka, Sri Lanka BC Corp	6130do	6130do							
0800 0900	Uganda, Radio	5026do	7110do	7196do	11955pa					
0800 0900	UK, BBC World Service	6190va	9740as	11940af	11955pa					
		12095eu	15310as	15360as	15400af					
		15485eu	15565eu	17640eu	17760as					

0800 0900	Palau, KHBN/Voice of Hope	15725as	15725as							
0800 0900	Papua New Guinea, NBC	4890do	4890do							
0800 0900	Sierra Leone, Sierra Leone BS	3316do	3316do							
0800 0900	Singapore, SBC Radio One	6150do	6150do							
0800 0900 vl	Solomon Islands, SIBC	5020do	5020do							
0800 0900	Sri Lanka, Sri Lanka BC Corp	6130do	6130do							
0800 0900	Uganda, Radio	5026do	7110do	7196do	11955pa					
0800 0900	USA, Armed Forces Radio	4778va	4778va							
		6350va	6458va							
		10940va	12579va							
		12095eu	15310as							
		15485eu	15565eu							
0800 0900	USA, KAIJ Dallas TX	5755va	5755va							
0800 0900	USA, KTBN Salt Lake City UT	7510na	7510na							
0800 0900	USA, KWHR Nadehu HI	11565pa	11565pa							

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0900	1000	USA, KAJI Dallas TX	13362va	16847va		
0900	1000	USA, KBTN Salt Lake City UT	5755va			
0900	1000	USA, KWHR Naalehu HI	7510na			
0900	1000	USA, Voice of America	11565pa	17780as		
0900	1000	USA, WEWN Birmingham AL	11930as	13610as	15150as	
0900	1000	USA, WHRA Greenbush ME	5825na			
0900	1000	USA, WHRI Noblesville IN	11730af			
0900	1000	USA, WJCR Uptown KY	5745va	7315am		
0900	1000 mtwhfa	USA, WRMI Miami FL	7490am	13595as		
0900	1000	USA, WSHB Cypress Crk SC	9955am			
0900	1000	USA, WTJC Newport NC	9455eu	9860eu	11615eu	
0900	1000	USA, WWCR Nashville TN	9370na			
0900	1000 vl	Vanuatu, Radio	2390na	5070na	5935na	7435na
0900	1000 vl	Vatican City, Vatican Radio	3945do	4960do	7260do	
0900	1000 mt hfa	Zambia, Christian Voice	5885eu			
0900	1000	Zambia, National BC Corp	9865do			
0900	1000 vl	Zimbabwe, Zimbabwe BC Corp	6165do	6265do		
0900	1000 vl	Greece, Voice of	5975do	6045do		
0910	0920	Greece, Voice of	12105eu	15630eu		
0915	1000 vl	Ghana, Ghana BC Corp	6130do	4915do		
0915	1000 vl/as	Ghana, Ghana BC Corp	4915do	4915do		
0930	1000	Australia, Radio	11880as	13605pa	15240as	17750as
			21820as			
0930	1000	Netherlands, Radio	9790as	12065as	13710as	
0945	1000	Germany, Deutsche Welle	6140eu			

1000	1100		USA, WEWN Birmingham AL	15240as	15425as	
1000	1100		USA, WHRI Noblesville IN	7425na	15745eu	
1000	1100		USA, WJCR Upton KY	6040na	9495am	
1000	1100	mtwhfa	USA, WRMI Miami FL	7490am	13595as	
1000	1100		USA, WRNO New Orleans LA	9955am		
1000	1100		USA, WSHB Cypress Crk SC	7395am		
1000	1100		USA, WTJC Newport NC	6095am	9455sa	11870as
1000	1100		USA, WVCR Nashville TN	9370na		
1000	1100		USA, WYFR Okeechobee FL	5070na	5935na	7435na 9475na
1000	1100	vl	Vanuatu, Radio	5950na		
1000	1100		Zambia, Christian Voice	3945do	4960do	7260do
1000	1100	vl	Zambia, National BC Corp	9865do		
1000	1100	vl	Zimbabwe, Zimbabwe BC Corp	6165do	6265do	
10000	1030		Switzerland, Swiss R International	5975do	6045do	
1030	1035		Israel, Kol Israel	15315eu		
1030	1045	mtwhf	Ethiopia, Radio	15640va	17545va	
1030	1100		Guam, KSDA/ Adventist World R	5990do	7110do	9705do
1030	1100		Malaysia, RTM Sarawak	11560as		
1030	1100		Mongolia, Voice of	7160do		
1030	1100		Netherlands, Radio	12085au		
1030	1100			6045eu	9760as	9860eu 12065as
				13710as		
1030	1100		Palau, KHBN/Voice of Hope	9965as	15725as	
1030	1100		Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15120as 17850as
1030	1100		UAE, Radio Dubai	13675eu	15370eu	15395eu

1000 UTC - 6AM E / 5AM C / 3AM P

1000	1027	Vietnam, Voice of	12019as	15115as
1000	1030	Guam, KSDA/ Adventist World R	11560as	11705as
1000	1030	Netherlands, Radio	9790as	12065as
1000	1030	Palau, KHBIN/Voice of Hope	15725as	
1000	1030	Singapore, RTE Radio	11685au	
1000	1030	Sri Lanka, Sri Lanka BC Corp	4940do	
1000	1100	Anguilla, Caribbean Beacon	11775am	
1000	1100 vl	Australia, ABC/Alice Springs	2310do	
1000	1100 vl	Australia, ABC/Katherine	2485do	
1000	1100 vl	Australia, ABC/Tennant Creek	2325do	
1000	1100	Australia, Christian Voice	13775as	17825as
1000	1100	Australia, Radio	11880as	13605pa
			21820as	15240as
1000	1100 as	Bhutan, Bhutan BC Service	6035do	
1000	1100 vl	Botswana, Radio	7255do	9600do
1000	1100	Canada, CFRX Toronto ON	6070do	
1000	1100	Canada, CFVP Calgary AB	6030do	
1000	1100	Canada, CHNX Halifax, NS	6130do	
1000	1100	Canada, CKZN St John's NF	6160do	
1000	1100	Canada, CKZU Vancouver BC	6160do	
1000	1100	China China Radio International	11730pa	15210pa
1000	1100	Costa Rica, R for Peace Intl	7455irr	15049va
1000	1100	Costa Rica, University Network	5030am	6150am
			11870am	13749na
1000	1100	Ecuador, HCJB	11755pa	21455usb
1000	1100 mwtwhf	Egypt, Radio Africa	15185af	
1000	1100 as/vl	Eqt. Guinea, Radio East Africa	15185af	
1000	1100 a/monthly	Finland, Scandv Weekend Radio	11690va	
1000	1100	Germany, Deutsche Welle	6140eu	
1000	1100 s	Germany, Sunshine Radio	6015eu	
1000	1100	Germany, Voice of Hope	21590me	
1000	1100 vl	Ghana, Ghana BC Corp	6130do	4915do
1000	1100 vl/as	Ghana, Ghana BC Corp	4915do	4915do
1000	1100	Guyana, Voice of	5949do	
1000	1100	India, All India Radio	11585as	13700au
			17840au	17895au
1000	1100 as/vl	Italy, Italian Radio Relay Service	7120va	
1000	1100	Japan, Radio	9695pa	15590as
1000	1100	Jordan, Radio	11690eu	
1000	1100	Kenya, Kenya BC Corp	4885irr	4915irr
1000	1100 vl	Lesotho, Radio	4800do	
1000	1100 vl	Liberia, ELWA	4760do	
1000	1100 vl	Liberia, R Liberia International	6100do	
1000	1100	Malaysia, Radio	7295do	
1000	1100	Namibia, Namibian BC Corp	7165af	7215af
1000	1100	New Zealand, R New Zealand Int	9885pa	
1000	1100	New Zealand, ZLXA	3935do	
1000	1100 vl	Nigeria, Radio/Enugu	6025do	
1000	1100 vl	Nigeria, Radio/Ibadan	6050do	
1000	1100 vl	Nigeria, Radio/Kaduna	4770do	6090do
1000	1100 vl	Nigeria, Radio/Lagos	4990do	7285do
1000	1100 vl	Nigeria, Voice of	7255af	15120af
1000	1100 vl	Papua New Guinea, NBC	4890do	9675irr
1000	1100	Sierra Leone, Sierra Leone BS	5980do	
1000	1100	Singapore, SBC Radio One	6150do	
1000	1100 vl	Solomon Islands, SIBC	5020do	
1000	1100	Uganda, Radio	5026do	7110do
1000	1100	UK, BBC World Service	6190au	6195va
			9740as	11760am
			11940af	12095eu
			15485eu	15565eu
			17760as	17790as
			17660as	17885af
			13362va	16847va
1000	1100 as	UK, BBC World Service	15190as	15400af
1000	1100	USA, Armed Forces Radio	4278va	4319va
			6350va	6458va
			10940va	12579va
			12689va	13254va
1000	1100	USA, KAII Dallas TX	5755va	
1000	1100	USA, KTBN Salt Lake City UT	7510na	
1000	1100	USA, KWHR Naalehu HI	9930as	11565pa
1000	1100	USA, Voice of America	6165am	7370am
			9590am	9770pa

1100 UTC - 7AM E / 6AM C / 4AM P

1100	1105	New Zealand, R New Zealand Int	9885pa			
1100	1105	Pakistan, Radio	17520eu	21465eu		
1100	1120	fa Kazakhstan, Radio Almaty	9620eu	11840eu		
1100	1127	Vietnam, Voice of	7285as			
1100	1130	Australia, Radio	5995pa	6020pa	9475as	9580va
			11650pa	11880as	12080va	13605va
			15240as	21820as		
1100	1130	Netherlands, Radio	6045eu	9790as	9860eu	12065as
			13710as			
1100	1130	Sri Lanka, Sri Lanka BC Corp	4940do	11835as	15210as	17850as
1100	1130	UK, BBC Caribbean Report	6195ca	15220ca		
1100	1130	as UK, BBC World Service	6195am	15190sa	15220am	
1100	1130	Ukraine, R Ukraine International	12040eu	15135na		
1100	1145	Germany, Deutsche Welle	6140eu	11785af	15410af	17860af
			21780af			
1100	1200	Anguilla, Caribbean Beacon	11775am			
1100	1200	vl Australia, ABC/Alice Springs	2310do			
1100	1200	vl Australia, ABC/Katherine	2485do			
1100	1200	vl Australia, ABC/Tennant Creek	2325do			
1100	1200	Australia, Christian Voice	13775as	17825as		
1100	1200	Botswana, Radio	7255do	9600do	7255do	
1100	1200	Bulgaria, Radio	15700eu	17500eu		
1100	1200	Canada, CBC Northern Service	9625do			
1100	1200	Canada, CFRX Toronto ON	6070do			
1100	1200	Canada, CFVP Calgary AB	6030do			
1100	1200	Canada, CHNX Halifax, NS	6130do			
1100	1200	Canada, CKZN St John's NF	6160do			
1100	1200	Canada, CKZU Vancouver BC	6160do			
1100	1200	Costa Rica, R for Peace Intl	7455irr	15049va		
1100	1200	Costa Rica, University Network	5030am	6150am	7375am	9724sa
			11870am	13749na	17645as	
1100	1200	Ecuador, HCJB	12005am	15115am	21455usb	
1100	1200	mtwhf Eqt Guinea, Radio Africa	15185af			
1100	1200	as/vl Eqt. Guinea, Radio East Africa	15185af			
1100	1200	aj/monthly Finland, Scandy Weekend Radio	11690va			
1100	1200	s Germany, Sunshine Radio	6015eu			
1100	1200	Germany, Voice of Hope	21590me			
1100	1200	vl Ghana, Ghana BC Corp	6130do	4915do		
1100	1200	vl/as Ghana, Ghana BC Corp	4915do	4915do		
1100	1200	Guyana, Voice of	5949do			
1100	1200	Iran, VOIRI	15385as	15430as	15585as	21470as
			21730as			
1100	1200	as/vl Italy, Italian Radio Relay Service	7120va			
1100	1200	Japan, Radio	6120na	9695pa	15590as	
1100	1200	Jordan, Radio	11690eu			
1100	1200	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
1100	1200	vl Lesotho, Radio	4800do			
1100	1200	vl Liberia, ELWA	4760do			
1100	1200	vl Liberia, R Liberia International	6100do			
1100	1200	Malaysia, Radio	7295do			
1100	1200	Malaysia, TRM Sarawak	7160do			
1100	1200	Namibia, Namibian BC Corp	7165af	7215af		
1100	1200	New Zealand, ZLXA	3935do			
1100	1200	vl Nigeria, Radio/Enugu	6025do			
1100	1200	vl Nigeria, Radio/Ibadan	6050do			
1100	1200	vl Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do

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1100 1200	USA, Armed Forces Radio	10940va 13362va	12579va 16847va	12689va 4993va	13254va 5765va	1200 1300	Namibia, Namibian BC Corp New Zealand, R New Zealand Int	7165af 11675as	7215af
1100 1200	USA, KAU Dallas TX	5755va				1200 1300	New Zealand, ZLXA	3935do	
1100 1200	USA, KTBN Salt Lake City UT	7510na				1200 1300	Nigeria, Radio/Enugu	6025do	
1100 1200	USA, KWHR Naalehu HI	9930as	11565pa			1200 1300	Nigeria, Radio/Ibadan	6050do	
1100 1200	USA, Voice of America	6160as 15160as	9645as 15240as	9760as 15425as	9770pa	1200 1300	Nigeria, Radio/Kaduna	4770do	6090do
1100 1200	USA, WEWN Birmingham AL	7425na	15745eu			1200 1300	Nigeria, Radio/Lagos	4990do	7285do
1100 1200	USA, WHRI Noblesville IN	6040na	9495am			1200 1300	Palau, KHBN/Voice of Hope	9965as	
1100 1200 o s	USA, WINB Red Lion PA	13750am				1200 1300	Papua New Guinea, NBC	4890do	9675irr
1100 1200	USA, WJCR Upton KY	7490am	13595as			1200 1300	Sierra Leone, Sierra Leone BS	5980do	
1100 1200 mtwhfa	USA, WRMI Miami FL	9955am				1200 1300	Singapore, R Singapore Intl	6150as	9600as
1100 1200	USA, WRNO New Orleans LA	7395am				1200 1300	Taiwan, Radio Taipei International	7130as	9610au
1100 1200	USA, WSHB Cypress Crk SC	6095am	9455am	11590am	11660am	1200 1300	Uganda, Radio	5026do	7110do
1100 1200	USA, WTJC Newport NC	9370na				1200 1300	UK, BBC World Service	5965na	9515as
1100 1200	USA, WWCR Nashville TN	5070na	5935na	7435na	15685na	1200 1300	USA, WHRI Noblesville IN	9815as	11940af
1100 1200	USA, WYFR Okeechobee FL	5850na	5950na			1200 1300	12095eu	15280as	11955as
1100 1200 vl/s	Vanuatu, Radio	3945do	4960do	7260do		1200 1300	USA, Voice of America	15565eu	15575as
1100 1200	Zambia, Christian Voice	9865do				1200 1300	USA, WEWN Birmingham AL	17830af	21470af
1100 1200 vl	Zambia, National BC Corp	6165do	6265do			1200 1300	USA, WHRI Noblesville IN	4278va	4319va
1100 1200 vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do			1200 1300	1200 1300	10940va	9493va
1105 1200	New Zealand, R New Zealand Int	11675as				1200 1300	USA, WINB Red Lion PA	6350va	6458va
1115 1145	Nepal, Radio	5005as	7165as			1200 1300	USA, WJCR Upton KY	10230va	
1120 1140 w	Kazakhstan, Radio Almaty	9620eu	11840eu			1200 1300	1200 1300	12689va	13254va
1130 1145 vl	Libya, Voice of Africa	11815af	15435af	17725af		1200 1300	USA, WRMI Miami FL	13362va	16847va
1130 1200	Australia, Radio	5995pa	6020pa	9475as	9580va	1200 1300	USA, KAUI Dallas TX	13815va	
		11650pa	11880as	12080va	13605va	1200 1300	USA, KTBN Salt Lake City UT	7510na	
1130 1200 a	Austria, R Austria International	6155eu	13730eu			1200 1300	USA, KWHR Naalehu HI	9930as	11565pa
1130 1200	Belgium, RVI Flanders R Int'l	9865as	9925eu			1200 1300	USA, Voice of America	6160as	9645as
1130 1200	Belgium, RVI Flanders R Int'l	9865as				1200 1300	1200 1300	9760as	15160as
1130 1200	Netherlands, Radio	6045eu	9860eu			1200 1300	USA, WEWN Birmingham AL	15240as	15425as
1130 1200	South Korea, R Korea Int'l	9650na				1200 1300	USA, WHRI Noblesville IN	9955am	
1130 1200	Sri Lanka, Sri Lanka BC Corp	4940do				1200 1300	1200 1300	13845na	15685na
1130 1200	Sweden, Radio	17505as	18960na			1200 1300	USA, WSHB Cypress Crk SC	6095am	9455am
1130 1200	Ukraine, R Ukraine International	15135na				1200 1300	1200 1300	9875as	11590am
1130 1200 f	Vatican City, Vatican Radio	15595va	17515va			1200 1300	USA, WTJC Newport NC	9370na	
1140 1200 t	Kazakhstan, Radio Almaty	9620eu	11840eu			1200 1300	USA, WWCR Nashville TN	7435na	12160na
1145 1200	Germany, Deutsche Welle	6140eu				1200 1300	USA, WWFV McCaysville GA	12172va	

1200 UTC - 8AM E / 7AM C / 5AM P

1200 1215	Somalia, Radio Galkayo	6985va				1200 1300	Vanuatu, Radio	3945do	
1200 1220 mtwhfa	UK, BBC Caribbean Report	6195ca	15220ca			1200 1300	USA, WTJC Newport NC	9370na	
1200 1220 as	UK, BBC World Service	6195am	15220am			1200 1300	USA, WWCR Nashville TN	7435na	12160na
1200 1225	Netherlands, Radio	6045eu	9860eu			1200 1300	USA, WWFV McCaysville GA	12172va	
1200 1230	France, R France International	15540eu	25820af			1200 1300	Vanuatu, Radio	3945do	4960do
1200 1230	Iran, VOIRI	15385as	15430as	15585as	21470as	1200 1300	Zambia, Christian Voice	9865do	13845na
1200 1230		21730as				1200 1300	Zambia, National BC Corp	6165do	6265do
1200 1230	Philippines, FEBC	15110as				1200 1300	Zimbabwe, Zimbabwe BC Corp	5975do	6045do
1200 1230	Sri Lanka, Sri Lanka BC Corp	4940do				1200 1300	Croatia, The Voice of Croatia	6165eu	9830eu
1200 1230	Switzerland, Swiss R International	15315eu				1200 1300	Egypt, Radio Cairo	17595as	
1200 1230	Uzbekistan, Radio Tashkent	7285as	9715as	15295as	17775as	1200 1300	Germany, Overcomer Ministries	9610eu	
1200 1245	USA, WYFR Okeechobee FL	5850na	5950na	17750na		1200 1300	Italy/Adv World Radio Europe	9610eu	
1200 1255	Poland, Radio Polonia	6095eu	7270eu	9525eu	11820eu	1200 1300	Sri Lanka, Sri Lanka BC Corp	4940do	6005as
1200 1256	North Korea, Voice of Korea	3560va	9640va	9850va	9975va	1200 1300	1200 1300	6075as	9770as
1200 1300	Anguilla, Caribbean Beacon	11775am				1200 1300	Sweden, Radio	17505as	18960na
1200 1300 vl	Australia, ABC/Alice Springs	2310do				1200 1300	Thailand, Radio	9655as	9885as
1200 1300 vl	Australia, ABC/Katherine	2485do				1200 1300	Turkey, Voice of	17810as	17830eu
1200 1300 vl	Australia, ABC/Tennant Creek	2325do				1200 1300	UK, Wales Radio Int'l/Merlin	17810au	
1200 1300	Australia, Christian Voice	13775as	13795as	9475as	9580as	1200 1300	1200 1300	13795as	13795as
1200 1300	Australia, Radio	5995pa	6020pa	21820	aas	1200 1300	Seychelles, FEBA Radio	15535me	
1200 1300	Bangladesh, Bangla Betar	7185as	9550as			1200 1300	USA, WYFR Okeechobee FL	17750na	
1200 1300 vl	Botswana, Radio	7255do	9600do	7255do		1200 1300	Taiwan, CBS	6180as	7250as
1200 1300	Brazil, Radio Nacional Bras	15445am				1200 1300	1200 1300	9630as	11725as
1200 1300	Canada, CBC Northern Service	9625do				1200 1300	1200 1300	11775as	
1200 1300	Canada, CFRX Toronto ON	6070do				1200 1300	Canada, CBC Northern Service	9625do	
1200 1300	Canada, CFVP Calgary AB	6030do				1200 1300	Canada, CFRX Toronto ON	6070do	
1200 1300	Canada, CHNX Halifax, NS	6130do				1200 1300	Canada, CFVP Calgary AB	6030do	
1200 1300	Canada, CKZN St John's NF	6160do				1200 1300	Canada, CHNX Halifax, NS	6130do	
1200 1300	Canada, CKZU Vancouver BC	6160do				1200 1300	Canada, CKZN St John's NF	6160do	
1200 1300	Canada, R Canada International	9660as	15190as			1200 1300	Canada, CKZU Vancouver BC	6160do	
1200 1300 mtwhfa	Canada, R Canada International	9640am	15305am	17820am		1200 1300	Canada, R Canada International	9640am	15305na
1200 1300	China China Radio International	9730as	9760pa	11675pa	11980as	1200 1300	1200 1300	11980as	15180as
1200 1300		15415pa				1200 1300	China China Radio International	7405na	9570na
1200 1300	Costa Rica, R for Peace Int'l	7455irr	21815usb			1200 1300	1200 1300	11675pa	11900pa
1200 1300	Costa Rica, University Network	5030am	6150am	7375am	9724sa	1200 1300	1200 1300	11675pa	
1200 1300		11870am	13749na	17645as		1200 1300	1200 1300	11675pa	
1200 1300	Ecuador, HCJB	12005am	15115am	21455usb		1200 1300	1200 1300	11675pa	
1200 1300 as/vl	Egypt, Guinea, Radio East Africa	15185af				1200 1300	1200 1300	11675pa	
1200 1300 o/monthly	Finland, Scandv Weekend Radio	11720va				1200 1300	1200 1300	11675pa	
1200 1300	Germany, Deutsche Welle	6140eu				1200 1300	1200 1300	11675pa	
1200 1300 s	Germany, Sunshine Radio	6015eu				1200 1300	1200 1300	11675pa	
1200 1300	Germany, Voice of Hope	15715me				1200 1300	1200 1300	11675pa	
1200 1300 vl	Ghana, Ghana BC Corp	4915do	6130do			1200 1300	1200 1300	11675pa	
1200 1300	Guyana, Voice of	5949do				1200 1300	1200 1300	11675pa	
1200 1300 as/vl	Italy, Italian Radio Relay Service	7120va				1200 1300	1200 1300	11675pa	
1200 1300	Jordan, Radio	11690eu				1200 1300	1200 1300	11675pa	
1200 1300	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr		1200 1300	1200 1300	11675pa	
1200 1300 vl	Lesotho, Radio	4800do				1200 1300	1200 1300	11675pa	
1200 1300 vl	Liberia, ELWA	4760do				1200 1300	1200 1300	11675pa	
1200 1300 vl	Liberia, R Liberia International	6100do				1200 1300	1200 1300	11675pa	
1200 1300	Malaysia, Radio	7295do				1200 1300	1200 1300	11675pa	

1300 UTC - 9AM E / 8AM C / 6AM P

1300 1305	New Zealand, R New Zealand Int	11675as				1300 1300	China, Voice of Hope	13820as	
1300 1320	Brazil, Radio Nacional Bras	15445am				1300 1300	Costa Rica, R for Peace Int'l	15049irr	21815usb
1300 1329	Czech Rep, Radio Prague Int'l	13580eu				1300 1300	Costa Rica, University Network	5030am	6150am
1300 1330	Australia, Radio	5995pa	6020pa	9475as	9580va	1300 1300	1200 1300	11800as	21820as
1300 1330		11650va	11880as			1300 1300	1200 1300	11800as	
1300 1330	Egypt, Radio Cairo	17595as				1300 1300	1200 1300	11800as	
1300 1330 s	Germany, Universal Life	9955na				1300 1300	1200 1300	11800as	
1300 1330	Guam, KSDA/ Adventist World R	15385as				1300 1300	1200 1300	11800as	
1300 1330	Turkey, Voice of	17810as				1300 1300	1200 1300	11800as	
1300 1400	Anguilla, Caribbean Beacon	11775am				1300 1400	1200 1300	11800as	
1300 1400	Australia, ABC/Alice Springs	2310do				1300 1400	1200 1300	11800as	
1300 1400	Australia, ABC/Katherine	2485do				1300 1400	1200 1300	11800as	
1300 1400	Australia, ABC/Tennant Creek	2325do				1300 1400	1200 1300	11800as	
1300 1400	Australia, Christian Voice	13775as	13795as	9475as	9580as	1300 1400	1200 1300	11800as	

Shortwave Guide



1300	1400	vl	Ghana, Ghana BC Corp	4915do	6130do		1400	1500	a/monthly	Finland, Scandy Weekend Radio	11720va			
1300	1400		Guyana, Voice of	5949do			1400	1500		France, R France International	11610me	17620as		
1300	1400	as/vl	Italy, Italian Radio Relay Service	7120va			1400	1500		Germany, Deutsche Welle	6140eu			
1300	1400		Jordan, Radio	11690eu			1400	1500	as	Germany, Overcomer Ministries	17490eu			
1300	1400		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	1400	1500		Germany, Overcomer Ministries	6110eu	13810af		
1300	1400	vl	Lesotho, Radio	4800do			1400	1500		Germany, Voice of Hope	15715me	17550as		
1300	1400	vl	Liberia, ELWA	4760do			1400	1500	vl	Ghana, Ghana BC Corp	4915do	6130do		
1300	1400	vl	Liberia, R Liberia International	6100do			1400	1500		Guyana, Voice of	5949do			
1300	1400		Malaysia, Radio	7295do			1400	1500		India, All India Radio	9690as	11620as	13710as	
1300	1400		Namibia, Namibian BC Corp	7165af	7215af		1400	1500	as/vl	Italy, Italian Radio Relay Service	7120va			
1300	1400		New Zealand, ZLXA	3935do			1400	1500		Japan, Radio	7200pa	9505na	11730as	17755me
1300	1400	vl	Nigeria, Radio/Enugu	6025do			1400	1500		Jordan, Radio	11690na	17680al		
1300	1400	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do			Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
1300	1400	vl	Nigeria, Radio/Lagos	4990do	7285do		1400	1500	vl	Lesotho, Radio	4800do			
1300	1400		Palau, KHBN/Voice of Hope	9965as			1400	1500	vl	Liberia, ELWA	4760do			
1300	1400	vl	Papua New Guinea, NBC	4890do	9675irr		1400	1500	vl	Liberia, R Liberia International	6100do			
1300	1400	as	S Africa, Channel Africa	11720af	11780af	21725af				Malaysia, Radio	7295do			
1300	1400		Sierra Leone, Sierra Leone BS	5980do			1400	1500		Malaysia, RTM Sarawak	7160do			
1300	1400		Singapore, R Singapore Intl	6150as	9600as		1400	1500		Namibia, Namibian BC Corp	7165af	7215af		
1300	1400		South Korea, R Korea Intl	9570as	13670om		1400	1500	occnsal	New Zealand, R New Zealand Int	6095pa			
1300	1400		Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as			New Zealand, ZLXA	3935do			
1300	1400			15425as			1400	1500	vl	Nigeria, Radio/Enugu	6025do			
1300	1400		Uganda, Radio	4976do	5026do		1400	1500	vl	Nigeria, Radio/Ibadan	6050do			
1300	1400		UK, BBC World Service	5965na	6190af	9515na	9740as			Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do
1300	1400			9815as	11760me	11865na	11940af			Nigeria, Radio/Lagos	4990do	7285do		
1300	1400			12095as	15310as	15420af	15485eu			Oman, Radio Sultanate of	15140va			
1300	1400			15565eu	15575eu	17640eu	17700as			Palau, KHBN/Voice of Hope	9965as			
1300	1400		USA, Armed Forces Radio	4278va	4319va	4993va	5765va			Russia, Voice of Russia WS	9495as	12055as	15510as	
1300	1400			6350va	6458va	6847va	10320va			S Africa, Channel Africa	11720af	17780af	21725af	
1300	1400			10940va	12579va	12689va	13254va			Sierra Leone, Sierra Leone BS	5980do			
1300	1400			13362va	16847va					Singapore, SBC Radio One	6150do			
1300	1400		USA, KAIJ Dallas TX	13815va						Sri Lanka, Sri Lanka BC Corp	4940do	6005as	6075as	9770as
1300	1400		USA, KJES Vado NM	11715na							15425as			
1300	1400		USA, KNLS Anchor Point AK	11870as							15425as			
1300	1400		USA, KTBN Salt Lake City UT	7510na							15425as			
1300	1400		USA, KWHR Naalehu HI	9930as	11565pa						15425as			
1300	1400		USA, Voice of America	6160as	9645as	9760as	15160as				15425as			
1300	1400	a	USA, WBCQ Monticello ME	17495na							15425as			
1300	1400		USA, WEWN Birmingham AL	11875na							15425as			
1300	1400		USA, WHRI Noblesville IN	6040na	15105am						15425as			
1300	1400		USA, WINB Red Lion PA	13570am							15425as			
1300	1400		USA, WJCR Upton KY	7490am	13595as						15425as			
1300	1400	mtwhfa	USA, WRMI Miami FL	15724na							15425as			
1300	1400	s	USA, WRMI Miami FL	9955am							15425as			
1300	1400		USA, WRCN New Orleans LA	7395am							15425as			
1300	1400		USA, WSHB Cypress Crk SC	9430na	9455am	9940as					15425as			
1300	1400		USA, WTJC Newport NC	9370na							15425as			
1300	1400		USA, WWFB Nashville TN	9475na	12160na	13845na	15685na				15425as			
1300	1400		USA, WWFW McCaysville GA	12172va							15425as			
1300	1400		USA, WYFR Okeechobee FL	11550as	11830na	11970na	17750na				15425as			
1300	1400		Zambia, Christian Voice	9865do							15425as			
1300	1400	vl	Zambia, National BC Corp	6165do	6265do						15425as			
1300	1400	vl	Zimbabwe, Zimbabwe BC Corp	5975do	6045do						15425as			
1305	1400	occnsal	New Zealand, R New Zealand Int	6095pa							15425as			
1325	1400		Germany, Voice of Hope	17550as							15425as			
1330	1357		Vietnam, Voice of	9730eu	11630eu	13740eu					15425as			
1330	1400		Australia, Radio	5995pa	6020pa	9475as	9580va				15425as			
1330	1400	s	Austria, R Austria International	6155eu	13730eu	21789as					15425as			
1330	1400		Guam, KSDA/ Adventist World R	11705as	11980as						15425as			
1330	1400		India, All India Radio	9690as	11620as	13710as					15425as			
1330	1400		Sweden, Radio	17505va	18960na						15425as			
1330	1400		UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu				15425as			
1330	1400		Uzbekistan, Radio Tashkent	7285as	9715as	15295as	17775as				15425as			

1400 UTC - 10AM E / 9AM C / 7AM P

1400	1430		Ecuador, HCJB	12005am	15115am	21455usb							
1400	1430		Guam, KSDA/ Adventist World R	17720as									
1400	1430		Thailand, Radio	9655as	9830as	11905as							
1400	1430	os	UK, BBC World Service	15425as									
1400	1430	s	USA, Voice of America	18275va									
1400	1456		Romania, R Romania International	15250eu	17735eu								
1400	1500		Anguilla, Caribbean Beacon	11775am									
1400	1500	vl	Australia, ABC/Alice Springs	2310do									
1400	1500	vl	Australia, ABC/Katherine	2485do									
1400	1500	vl	Australia, ABC/Tennant Creek	2325do									
1400	1500		Australia, Christian Voice	13730as	13795as								
1400	1500		Australia, Radio	5995va	9580va	11660as							
1400	1500	vl	Botswana, Radio	7255do	9600do	7255do							
1400	1500	vl	Cameroon, CRTV Radio Buea	6005do									
1400	1500		Canada, CBC Northern Service	9625do									
1400	1500		Canada, CFRX Toronto ON	6070do									
1400	1500		Canada, CFVP Calgary AB	6030do									
1400	1500		Canada, CHNX Halifax, NS	6130do									
1400	1500		Canada, CKZN St John's NF	6160do									
1400	1500		Canada, CKZU Vancouver BC	6160do									
1400	1500		Canada, R Canada International	9640am	15305na								
1400	1500	mtwhfa	Canada, R Canada International	17820am									
1400	1500	as	Canada, R Canada International	17800am									
1400	1500		China China Radio International	7180as	7405na	9700as	11675as						
1400	1500			11765as	13685af	15125af							
1400	1500		China, Voice of Hope	13820as									
1400	1500		Costa Rica, R for Peace Intl	15049irr	21815usb								
1400	1500		Costa Rica, University Network	5030am	6150am	7375am	9724sa						
1400	1500			11870am	13749na	17645as							
1400	1500	as/vl	Eqt. Guinea, Radio East Africa	15185af									

1500 UTC - 11AM E / 10AM C / 8AM P

1500	1530		Australia, Radio	5995va	9580va	11650va	11660as						
1500	1530		Germany, Voice of Hope	17550as									
1500	1530		Mexico, R Mexico International	9705am									
1500	1530		Mongolia, Voice of	12015as									
1500	1530		S Africa, Channel Africa	17770af									
1500	1530	a	Seychelles, FEBA Radio	11600as									
1500	1530		USA, VOA Special English	12040as	15550as	9590as	9760as	9845as					
1500	1556		North Korea, Voice of Korea	4405va	6574na	9335na	11710na						

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1500	1600	China, Voice of Hope	15125af	1600	1650	occnsal	New Zealand, R New Zealand Int	11665af	17595as	21840af	
1500	1600	Costa Rica, R for Peace Intl	13820as	1600	1656		North Korea, Voice of Korea	6095pa			
1500	1600	Costa Rica, University Network	15049irr	1600	1700		Algeria, R Algiers International	3560va	6520va	9960va	
			5030am	16150am	7375am	9724sa		11715va	15160va	9975va	
			11870am	13749na	17645as						
1500	1600	Eqt. Guinea, Radio East Africa	15185af	1600	1700	vl	Anguilla, Caribbean Beacon	11775am			
1500	1600	Finland, Scandv Weekend Radio	11720va	1600	1700	vl	Australia, ABC/Alice Springs	2310do			
1500	1600	Germany, Deutsche Welle	6140eu	1600	1700	vl	Australia, ABC/Katherine	2485do			
1500	1600	Germany, Overcomer Ministries	17490eu	1600	1700	vl	Australia, ABC/Tennant Creek	2325do			
1500	1600	Germany, Overcomer Ministries	5110eu	1600	1700	vl	Australia, Christian Voice	13730as	13795as		
1500	1600	Germany, Voice of Hope	13810af	1600	1700	vl	Australia, Radio	5995va	9475as	9580va	
1500	1600	Ghana, Ghana BC Corp	15715me	1600	1700			11660as		11650va	
1500	1600	Guam, KTRW/ Trans World R	6130do	1600	1700	vl	Botswana, Radio	3356do	4820do	7255do	
1500	1600	Guyana, Voice of	15330as	1600	1700		Canada, CBC Northern Service	9625do			
1500	1600	Japan, Radio	5949do	1600	1700		Canada, CFRX Toronto ON	6070do			
1500	1600	Jordan, Radio	7200pa	1600	1700		Canada, CFVP Calgary AB	6030do			
1500	1600	Kenya, Kenya BC Corp	11690na	1600	1700		Canada, CHNX Halifax, NS	6130do			
1500	1600	Lesotho, Radio	17680al	1600	1700		Canada, CKZN St John's NF	6160do			
1500	1600	Liberia, ELWA	4885irr	1600	1700		Canada, CKZU Vancouver BC	6160do			
1500	1600	Liberia, R Liberia International	4760do	1600	1700		China China Radio International	7190af	13650pf		
1500	1600	Malaysia, Radio	6100do	1600	1700		Costa Rica, R for Peace Intl	15049irr	21815us		
1500	1600	Malaysia, RTM Kota Kinabalu	7295do	1600	1700		Costa Rica, University Network	5030am	6150am	7375am	
1500	1600	Malaysia, RTM Sarawak	5980do	1600	1700			11870am	13749na	9724sa	
1500	1600	Myanmar, Radio	7160do	1600	1700		Ethiopia, Radio	7165af	9560af		
1500	1600	Namibia, Namibian BC Corp	5985do	1600	1700	a/monthly	Finland, Scandv Weekend Radio	11615af			
1500	1600	Netherlands, Radio	7165af	1600	1700		France R France International	17605af	11995af	12015af	
1500	1600	New Zealand, R New Zealand Int	9890as	1600	1700			17850af	15605af		
1500	1600	New Zealand, ZLXA	11835as	1600	1700						
1500	1600	Nigeria, Radio/Enugu	6025do	1600	1700	a	Germany, Good News World R	15105af			
1500	1600	Nigeria, Radio/Ibadan	6050do	1600	1700	vl	Germany, Overcomer Ministries	17490eu			
1500	1600	Nigeria, Radio/Kaduna	4770do	1600	1700	a	Ghana, Ghana BC Corp	4915do	6130do		
1500	1600	Nigeria, Radio/Lagos	6090do	1600	1700		Greece, Voice of	9420eu	15630eu	17705na	
1500	1600	Nigeria, Voice of	7285do	1600	1700		Guam, KSDA/ Adventist World R	11850as			
1500	1600	Russia, Voice of Russia WS	7255af	1600	1700		Guyana, Voice of	5949do			
1500	1600	Sierra Leone, Sierra Leone BS	4940me	1600	1700		Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	
1500	1600	Singapore, SBC Radio One	4940me	1600	1700		Lesotho, Radio	4800do			
1500	1600	Sri Lanka, Sri Lanka BC Corp	11500as	1600	1700		Liberia, ELWA	4760do			
1500	1600	Uganda, Radio	11985me	1600	1700		Liberia, R Liberia International	6100do			
1500	1600	UK, BBC World Service	11985na	1600	1700		Malaysia, Radio	7295do			
1500	1600	UK, Merlin Network One	12170af	1600	1700		Namibia, Namibian BC Corp	7165af	7215af		
1500	1600	USA, Armed Forces Radio	21490af	1600	1700		New Zealand, ZLXA	3935do			
1500	1600	USA, KAIJ Dallas TX	6175eu	1600	1700		Nigeria, Radio/Enugu	6025do			
1500	1600	USA, KTBN Salt Lake City UT	4278va	1600	1700		Nigeria, Radio/Ibadan	6050do			
1500	1600	USA, KWHR Ndalehu HI	6350va	1600	1700		Nigeria, Radio/Kaduna	4770do	6090do	7275do	
1500	1600	USA, Voice of America	10940va	1600	1700		Nigeria, Radio/Lagos	3326do	4990do	9570do	
1500	1600	USA, WBCQ Monticello ME	13362va	1600	1700		Nigeria, Voice of	7255af	15120af		
1500	1600	USA, WEWN Birmingham AL	13815va	1600	1700		Russia, Voice of Russia WS	9875as	11985me	12065as	
1500	1600	USA, WHRA Greenbush ME	15590na	1600	1700		S Africa, World Beacon	6145af		15540me	
1500	1600	USA, WHRI Noblesville IN	9930as	1600	1700		Sierra Leone, Sierra Leone BS	5980do			
1500	1600	USA, WINB Red Lion PA	15150as	1600	1700		South Korea, R Korea Intl	5975om	6150eu	9870af	
1500	1600	USA, WJCR Upton KY	15255va	1600	1700		Sri Lanka, Sri Lanka BC Corp	4940do			
1500	1600	USA, WRMI Miami FL	17495na	1600	1700		Taiwan, Radio Taipei International	11550as			
1500	1600	USA, WRMI Miami FL	11875na	1600	1700		Uganda, Radio	4976do	5026do		
1500	1600	USA, WRNO New Orleans LA	17650af	1600	1700		UK, BBC World Service	3915as	5975as	6190af	
1500	1600	USA, WTJC Newport NC	13760va	1600	1700			6190af	6195as		
1500	1600	USA, WWCR Nashville TN	1570na	1600	1700			7160as	9410eu	9515na	
1500	1600	USA, WWFV McCaysville GA	9475na	1600	1700			9740as	11940af	12095eu	
1500	1600	USA, WYFR Okeechobee FL	12172va	1600	1700				15310as		
1500	1600	Zambia, Christian Voice	5280as	1600	1700			15400af	15485eu	15565eu	17700as
1500	1600	Zambia, National BC Corp	11830na	1600	1700			17830af	17840am	21470af	21660af
1500	1600	Zimbabwe, Zimbabwe BC Corp	17750na	1600	1700						
1530	1600	Austria, AWR Europe	17660as	1600	1700						
1530	1600	Austria, R Austria International	6159eu	1600	1700						
1530	1600	Botswana, Radio	13730eu	1600	1700						
1530	1600	Georgia, Georgian Radio	17865na	1600	1700						
1530	1600	Iran, VOIRI	6180me	1600	1700						
1530	1600	Iran, VOIRI	9635as	1600	1700						
1530	1600	S Africa, World Beacon	1245af	1600	1700						
1545	1600	Seychelles, FEBA Radio	11600as	1600	1700						
1550	1600	Vatican, Radio	12065au	1600	1700						
1500	1600	Vatican City, Vatican Radio	13765au	1600	1700						
1500	1600	Pakistan, Radio	15150na	1600	1700						
1500	1600	Netherlands, Radio	11835na	1600	1700						
1600	1627	Czech Rep, Radio Prague Intl	15725af	1600	1700						
1600	1630	Iran, VOIRI	17475af	1600	1700						
1600	1630	Israel, Kol Israel	15615va	1600	1700						
1600	1630	Jordan, Radio	15640va	1600	1700						
1600	1630	Mexico, R Mexico International	11690na	1600	1700						
1600	1630	S Africa, Channel Africa	17870am	1600	1700						
1600	1630	Zimbabwe, Zimbabwe BC Corp	9525af	1600	1700						
1600	1640	UAE, Radio Dubai	5975do	1600	1700						
1600	1645	Germany, Deutsche Welle	13630eu	1600	1700						
1600	1615	Vatican City, Vatican Radio	12065au	1600	1700						
1600	1625	Pakistan, Radio	11570me	1600	1700						
1600	1627	Netherlands, Radio	9890as	1600	1700						
1600	1627	Czech Rep, Radio Prague Intl	15725af	1600	1700						
1600	1630	Iran, VOIRI	17475af	1600	1700						
1600	1630	Israel, Kol Israel	15615va	1600	1700						
1600	1630	Jordan, Radio	15640va	1600	1700						
1600	1630	Mexico, R Mexico International	11690na	1600	1700						
1600	1630	S Africa, Channel Africa	17870am	1600	1700						
1600	1630	Zimbabwe, Zimbabwe BC Corp	9525af	1600	1700						
1600	1640	UAE, Radio Dubai	13630eu	1600	1700						
1600	1645	Germany, Deutsche Welle	12065au	1600	1700						
1600	1615	Vatican City, Vatican Radio	13765au	1600	1700						
1600	1625	Pakistan, Radio	15150na	1600	1700						
1600	1627	Netherlands, Radio	11835na	1600	1700						
1600	1627	Czech Rep, Radio Prague Intl	15725af	1600	1700						
1600	1630	Iran, VOIRI	17475af	1600	1700						
1600	1630	Israel, Kol Israel	15615va	1600	1700						
1600	1630	Jordan, Radio	15640va	1600	1700						
1600	1630	Mexico, R Mexico International	11690na	1600	1700						
1600	1630	S Africa, Channel Africa	17870am	1600	1700						
1600	1630	Zimbabwe, Zimbabwe BC Corp	9525af	1600	1700						
1600	1640	UAE, Radio Dubai	13630eu	1600	1700						
1600	1645	Germany, Deutsche Welle	12065au	1600	1700						
1600	1615	Vatican City, Vatican Radio	13765au	1600	1700						
1600	1625	Pakistan, Radio	15150na	1600	1700						
1600	1627	Netherlands, Radio	11835na	1600	1700						
1600	1627	Czech Rep, Radio Prague Intl	15725af	1600	1700						
1600	1630	Iran, VOIRI	17475af	1600	1700						
1600	1630	Israel, Kol Israel	15615va	1600	1700						
1600	1630	Jordan, Radio	15640va	1600	1700						
1600	1630	Mexico, R Mexico International	11690na	1600	1700						
1600	1630	S Africa, Channel Africa	17870am	1600	1700						
1600	1630	Zimbabwe, Zimbabwe BC Corp	9525af	1600	1700						
1600	1640	UAE, Radio Dubai	13630eu	1600	1700						
1600	1645	Germany, Deutsche Welle	12065au	1600	1700						
1600	1615	Vatican City, Vatican Radio	13765au	1600	1700						
1600	1625	Pakistan, Radio	15150na	1600	1700						
1600	1627	Netherlands, Radio	11835na	1							

Shortwave Guide



1630 1700 vl Zimbabwe, Zimbabwe BC Corp 4828do 6045do
 1645 1700 Germany, Deutsche Welle 6140eu
 1650 1700 mtwhf New Zealand, R New Zealand Int 6095as

1700 UTC - 1PM E / 12PM C / 10AM P

1700 1727 Czech Rep, Radio Prague Intl 5930eu 21745af
 1700 1727 Vietnam, Voice of 12070eu
 1700 1730 Azerbaijan, Voice of 6110eu 9155eu
 1700 1730 France R France International 15605af 17605af
 1700 1730 Germany, Overcomer Ministries 6110eu
 1700 1730 S Africa, Channel Africa 17870af
 1700 1755 Poland, Radio Polonia 6000eu 7285eu
 1700 1756 Romania, R Romania International 11740eu 15365eu 15380eu 17805eu
 1700 1800 Anguilla, Caribbean Beacon 11775am
 1700 1800 Australia, ABC/Alice Springs 2310do
 1700 1800 vl Australia, ABC/Katherine 2485do
 1700 1800 vl Australia, ABC/Tennant Creek 2325do
 1700 1800 Australia, Christian Voice 9720as 11890as
 1700 1800 Australia, Radio 5995va 9475as 9580va 9655va
 1700 1800 Botswana, Radio 9815as 11880va
 1700 1800 vl Botswana, Radio 3356do 4820do 7255do
 1700 1800 Canada, CBC Northern Service 9625do
 1700 1800 Canada, CFRX Toronto ON 6070do
 1700 1800 Canada, CFVP Calgary AB 6030do
 1700 1800 Canada, CHNX Halifax, NS 6130do
 1700 1800 Canada, CKZN St John's NF 6160do
 1700 1800 Canada, CKZU Vancouver BC 6160do
 1700 1800 China China Radio International 7150af 9570af 9670af 9695af
 1700 1800 Costa Rica, R for Peace Intl 15049irr 21815usb
 1700 1800 Costa Rica, University Network 5030am 6150am 7375am 9724sa
 1700 1800 Costa Rica, University Network 11870am 13749na 17645as
 1700 1800 Egypt, Radio Cairo 15255af
 1700 1800 mtwhf Eqt Guinea, Radio Africa 15185af
 1700 1800 a/monthly Finland, Scandv Weekend Radio 11690va
 1700 1800 Germany, Deutsche Welle 6140eu
 1700 1800 a Germany, Good News World R 11795me
 1700 1800 a Germany, Overcomer Ministries 17490eu
 1700 1800 Germany, Voice of Hope 9495eu
 1700 1800 Germany, Unt Methodist Church 13820af 15485af
 1700 1800 vl Ghana, Ghana BC Corp 3366do 4915do
 1700 1800 Guyana, Voice of 5949do
 1700 1800 vl Italy, Italian Radio Relay Service 3985va
 1700 1800 Japan, Radio 9505na 11970eu 15355af
 1700 1800 Kenya, Kenya BC Corp 4885irr 4915irr 4885irr
 1700 1800 vl Lesotho, Radio 4800do
 1700 1800 vl Liberia, ELWA 4760do
 1700 1800 vl Liberia, R Liberia International 6100do
 1700 1800 Namibia, Namibian BC Corp 3270af 3289af
 1700 1800 mtwhf New Zealand, R New Zealand Int 6095as
 1700 1800 New Zealand, ZLXA 3935do
 1700 1800 vl Nigeria, Radio/Enugu 6025do
 1700 1800 vl Nigeria, Radio/Ibadan 6050do
 1700 1800 vl Nigeria, Radio/Kaduna 4770do 6090do 7275do 9570do
 1700 1800 vl Nigeria, Radio/Lagos 3326do 4990do
 1700 1800 as Russia, Voice of Russia WS 7420eu 9480eu 9820eu
 1700 1800 as Russia, Voice of Russia WS 9495af 9685eu 9775eu 9890eu
 1700 1800 11510af 11985af
 1700 1800 S Africa, World Beacon 6145af
 1700 1800 Sierra Leone, Sierra Leone BS 5980do
 1700 1800 Sri Lanka, Sri Lanka BC Corp 4940irr
 1700 1800 vl Sudan, Radio Omdurman 7199do 9200do 9505do
 1700 1800 Uganda, Radio 4976do 5026do
 1700 1800 UK, BBC World Service 3255af 3915as 5975as 6005af
 1700 1800 6190af 6195eu 7160as 9410eu
 1700 1800 9510as 9630af 9740as 12095eu
 1700 1800 15400af 15420af 15485eu 15575me
 1700 1800 17830af 17840na 21470af
 1700 1800 as UK, Merlin Network One 11540as
 1700 1800 UK, World Beacon 15455eu
 1700 1800 USA, Armed Forces Radio 4278va 4319va 4993va 5765va
 1700 1800 6350va 6458va 6847va 10320va
 1700 1800 10940va 12579va 12689va 13254va
 1700 1800 13362va 16847va
 1700 1800 USA, KAJ Dallas TX 13815va
 1700 1800 USA, KBTN Salt Lake City UT 15590na
 1700 1800 USA, KWHR Naalehu HI 9930as
 1700 1800 USA, Voice of America 6160as 7125as 7170as 9645as
 1700 1800 9700me 9760af 15255va 15410af
 1700 1800 15445af 17895af
 1700 1800 mtwhf USA, Voice of America 5990as 6045as 7215as 9550as
 1700 1800 9770as 9785as
 1700 1800 USA, WBCQ Monticello ME 17495na
 1700 1800 USA, WEWN Birmingham AL 11875na 13615na 15745eu
 1700 1800 USA, WHRA Greenbush ME 17650af
 1700 1800 USA, WHRI Noblesville IN 9495am 13760va
 1700 1800 USA, WINB Red Lion PA 13570am
 1700 1800 USA, WJCR Upton KY 7490am 13595as
 1700 1800 USA, WMLK Bethel PA 15265eu
 1700 1800 mtwhf USA, WRMI Miami FL 15724na
 1700 1800 USA, WRNO New Orleans LA 7395am 15420al
 1700 1800 USA, WSHB Cypress Crk SC 18910af
 1700 1800 USA, WTJC Newport NC 9370na
 1700 1800 USA, WVCR Nashville TN 9475na 12160na 13845na 15685na
 1700 1800 USA, WWFR McCaysville GA 12172va
 1700 1800 USA, WYFR Okeechobee FL 13855af 18980eu 21455eu
 1700 1800 Zambia, Christian Voice 4965do
 1700 1800 vl Zambia, National BC Corp 6165do 6265do

1700 1800 vl Zimbabwe, Zimbabwe BC Corp 4828do 6045do
 1725 1740 Germany, Trans World Radio 5855eu
 1725 1745 mtwhf UK, United Nations Radio 6125af 15265me 17580af
 1730 1745 vl Libya, Voice of Africa 11815af 15435af 17725af
 1730 1745 mtwhf Swaziland, Trans World Radio 9500af
 1730 1745 mtwhf Swaziland, Trans World Radio 3200af
 1730 1800 Belgium, RVI Flanders R Intl 5910eu 9925eu 13770eu
 1730 1800 Georgia, Georgian Radio 6230eu
 1730 1800 as a Georgia, Georgian Radio 6080as
 1730 1800 Guam, KSDA/ Adventist World R 11965as
 1730 1800 Netherlands, Radio 6020af 7120af 11655af
 1730 1800 Philippines, Radyo Pilipinas 11720pa 15190pa 17720pa
 1730 1800 S Africa, Adv World Radio Africa 12130af
 1730 1800 Sweden, Radio 6065va
 1730 1800 Sweden, Radio 13580eu
 1730 1800 Switzerland, Swiss R International 15220af 17640af 21720af
 1730 1800 Vatican City, Vatican Radio 13765af 15570af 17515af
 1735 1745 vl/th Paraguay, Radio Nacional 9739sa
 1745 1800 Bangladesh, Bangla Betar 7185eu 9550eu 15520eu
 1745 1800 India, All India Radio 7410eu 9950as 11620eu 11935as
 1745 1800 Swaziland, Trans World Radio 13750af 15200af 17670af
 1745 1800 smtwhf Swaziland, Trans World Radio 3200af
 1745 1800 Swaziland, Trans World Radio 3200af

1800 UTC - 2PM E / 1PM C / 11AM P

1800 1827 Vietnam, Voice of 7145eu 9730eu
 1800 1830 Egypt, Radio Cairo 15255af
 1800 1830 s Germany, Universal Life 13855af
 1800 1830 Netherlands, Radio 6020af 7120af 11655af
 1800 1830 S Africa, Adv World Radio Africa 5960af 6100af
 1800 1830 S Africa, Channel Africa 17870af
 1800 1830 mtwhf UK, Merlin Network One 11590as
 1800 1830 UK, Merlin Network One 11540as
 1800 1830 f UK, Merlin Network One 11535as
 1800 1830 UK, RTE Radio 15315me
 1800 1850 mtwhf New Zealand, R New Zealand Int 6095as
 1800 1859 Canada, R Canada International 13690af 15200af 17820af 21570af
 1800 1900 Anguilla, Caribbean Beacon 11775am
 1800 1900 mtwhf Argentina, RAE 15345eu
 1800 1900 vl Australia, ABC/Alice Springs 2310do
 1800 1900 vl Australia, ABC/Katherine 2485do
 1800 1900 vl Australia, ABC/Tennant Creek 2325do
 1800 1900 Australia, Christian Voice 9720as 11890as
 1800 1900 Australia, Radio 6080pa 7240va 9475as 9580va
 1800 1900 9815pa 11880va
 1800 1900 Bangladesh, Bangla Betar 7185eu 9550eu 15520eu
 1800 1900 vl Botswana, Radio 3356do 4820do
 1800 1900 Canada, CBC Northern Service 9625do
 1800 1900 Canada, CFRX Toronto ON 6070do
 1800 1900 Canada, CFVP Calgary AB 6030do
 1800 1900 Canada, CHNX Halifax, NS 6130do
 1800 1900 Canada, CKZN St John's NF 6160do
 1800 1900 Canada, CKZU Vancouver BC 6160do
 1800 1900 Costa Rica, R for Peace Intl 15049irr 21815usb
 1800 1900 Costa Rica, University Network 5030am 6150am 7375am 9724sa
 1800 1900 11870am 13749na 17645as
 1800 1900 mtwhf Eqt Guinea, Radio Africa 15185af
 1800 1900 a/monthly Finland, Scandv Weekend Radio 11690va
 1800 1900 Germany, Deutsche Welle 6140eu
 1800 1900 Germany, Unt Methodist Church 13820af 15485af
 1800 1900 Germany, Voice of Hope 9495eu
 1800 1900 Ghana, Ghana BC Corp 3366do 4915do
 1800 1900 Greece, Voice of 9420eu 15630eu 17705na
 1800 1900 Guyana, Voice of 5949do
 1800 1900 India, All India Radio 7410as 9950as 11620as 11935as
 1800 1900 13790af 15200af 17670af
 1800 1900 Italy, Italian Radio Relay Service 3985va
 1800 1900 Kenya, Kenya BC Corp 4885irr 4915irr 4885irr
 1800 1900 Kuwait, Radio 11990va
 1800 1900 vl Lesotho, Radio 4800do
 1800 1900 vl Liberia, ELWA 4760do
 1800 1900 vl Liberia, R Liberia International 5100do
 1800 1900 Namibia, Namibian BC Corp 3270af 3289af
 1800 1900 New Zealand, ZLXA 3935do
 1800 1900 Nigeria, Radio/Enugu 6025do
 1800 1900 Nigeria, Radio/Ibadan 6050do
 1800 1900 Nigeria, Radio/Kaduna 4770do 6090do 7275do 9570do
 1800 1900 Nigeria, Radio/Lagos 3326do 4990do
 1800 1900 Philippines, Radyo Pilipinas 11720pa 15190pa 17720pa
 1800 1900 Russia, Voice of Russia WS 7300eu 9480eu 9495af 9685eu
 1800 1900 9775eu 9890eu 11630eu 11675eu
 1800 1900 11695me 11980af
 1800 1900 m S Africa, Amateur Radio League 3215af
 1800 1900 as S Africa, Radio Lufonia 3345af
 1800 1900 s S Africa, World Beacon 3230af 9675af 17665af
 1800 1900 Sierra Leone, Sierra Leone BS 5980do
 1800 1900 Swaziland, Trans World Radio 3200af 9500af
 1800 1900 Taiwan, Radio Taipei International 3955eu
 1800 1900 Uganda, Radio 4976do 5026do
 1800 1900 UK, BBC World Service 3255af 5975as 6005af 6190eu
 1800 1900 6195eu 9410eu 9510as 9740pa
 1800 1900 12095eu 15400af 15420af 15575me
 1800 1900 17830af 17840na 21470af
 1800 1900 UK, World Beacon 15585af 17665af
 1800 1900 USA, Armed Forces Radio 4278va 4319va 4993va 5765va
 1800 1900 6350va 6458va 6847va 10320va
 1800 1900 10940va 12579va 12689va 13254va
 1800 1900 13362va 16847va
 1800 1900 USA, KAJ Dallas TX 13815va
 1800 1900 USA, KBTN Salt Lake City UT 15590na
 1800 1900 USA, KWHR Naalehu HI 9930as
 1800 1900 USA, Voice of America 6160as 7125as 7170as 9645as
 1800 1900 9700me 9760af 15255va 15410af
 1800 1900 15445af 17895af
 1800 1900 USA, Voice of America 5990as 6045as 7215as 9550as
 1800 1900 9770as 9785as
 1800 1900 USA, WBCQ Monticello ME 17495na
 1800 1900 USA, WEWN Birmingham AL 11875na 13615na 15745eu
 1800 1900 USA, WHRA Greenbush ME 17650af
 1800 1900 USA, WHRI Noblesville IN 9495am 13760va
 1800 1900 USA, WINB Red Lion PA 13570am
 1800 1900 USA, WJCR Upton KY 7490am 13595as
 1800 1900 USA, WMLK Bethel PA 15265eu
 1800 1900 mtwhf USA, WRMI Miami FL 15724na
 1800 1900 USA, WRNO New Orleans LA 7395am 15420al
 1800 1900 USA, WSHB Cypress Crk SC 18910af
 1800 1900 USA, WTJC Newport NC 9370na
 1800 1900 USA, WVCR Nashville TN 9475na 12160na 13845na 15685na
 1800 1900 USA, WWFR McCaysville GA 12172va
 1800 1900 USA, WYFR Okeechobee FL 13855af 18980eu 21455eu
 1800 1900 Zambia, Christian Voice 4965do
 1800 1900 vl Zambia, National BC Corp 6165do 6265do

Shortwave Guide



1800 1900	USA, KAIJ Dallas TX	13815va					11675eu	12070eu
1800 1900	USA, KJES Vado NM	15385au					7360eu	
1800 1900	USA, KBNT Salt Lake City UT	15590na					3230af	9675af 11640af
1800 1900	USA, KWHR Naalehu HI	17510as					3316do	
1800 1900	USA, Voice of America	6035af 7415af 9760af 9770me 11975af 15410af 15580af 17895af					5020do	
1800 1900 mtwhfa	USA, WBCQ Monticello ME	17495na					5975om	7275eu
1800 1900	USA, WEWN Birmingham AL	11875na 13615na 15745eu					9400irr	
1800 1900	USA, WHRA Greenbush ME	17650af					6010eu	
1800 1900	USA, WHRI Noblesville IN	9495am 13760va					3200af	
1800 1900	USA, WINB Red Lion PA	13570am					7160eu	9655eu 11905eu
1800 1900	USA, WJCR Upton KY	7490am 13595as					4976do	5026do
1800 1900	USA, WMLK Bethel PA	15265eu					3255af	6005af 6195eu
1800 1900 mtwhf	USA, WRMI Miami FL	15724na					9410eu	9630af 12095eu
1800 1900	USA, WRNO New Orleans LA	7395am 15420al					15400af	15575me 17830af
1800 1900	USA, WSHB Cypress Crk SC	15665va 18910af					17840na	
1800 1900	USA, WTJC Newport NC	9370na					9675eu	15585eu
1800 1900	USA, WWCR Nashville TN	9475na 12160na 13845na 15685na					4278va 4319va 6350va 6458va 10940va 12579va 13689va	4993va 5765va 6847va 10320va 12689va 13254va
1800 1900	USA, WWFV McCaysville GA	12172va					13362va	16847va
1800 1900	USA, WYFR Okeechobee FL	18980eu					13815va	
1800 1900	Yemen, Rep of Yemen Radio	9780me					15590na	
1800 1900	Zambia, Christian Voice	4965do					17510as	
1800 1900 vl	Zambia, National BC Corp	6165do 6265do					7260eu	9680me 13690me
1800 1900 vl	Zimbabwe, Zimbabwe BC Corp	4828do 6045do					4950af	6035af 6160me 7375af
1800 \	Sri Lanka, Sri Lanka BC Corp	4940irr					7415af	9525pa 9760af 9770af
1805 1810	Croatia, The Voice of Croatia	6165eu 13830eu					11805pa	11975af 15180pa 15410af
1815 1845 s	S Africa, Radio Lufonia	7155af					15445af	15580af
1830 1855	Greece, Voice of	11645eu					9500eu	9840as 11780me 11780me
1830 1900	Ascension Island, RTE Radio	21630af					11970as	12015as 13725me 15235as
1830 1900	Austria, R Austria International	5945eu 6155eu					17495na	
1830 1900 vl	Cameroon, CRTV Radio Buea	6005do					1900 2000	
1830 1900	Canada, RTE Radio	13640na					13615na	15745eu
1830 1900	Georgia, Georgian Radio	11760eu					1900 2000	
1830 1900	Netherlands, Radio	6020af 7120af 9895af 11655af 13700af 17605af 21590af					1900 2000	
1830 1900	Slovakia, R Slovakia International	5920eu 6055eu 7345eu					1900 2000	
1830 1900	Turkey, Voice of	9730as 9785eu					1900 2000	
1830 1900 os	USA, Voice of America	11690af 13730af 15525af					1900 2000	
1830 1900	Yugoslavia, Radio	6100eu					1900 2000	
1845 1900	Albania, R Tirana International	7210eu 9510eu					1900 2000	
1845 1900	Congo, RTV Congolaise	5985do					1900 2000	
1850 1900	New Zealand, R New Zealand Int	11725pa					1900 2000	

1900 UTC - 3PM E / 2PM C / 12PM P

1900 1927	Vietnam, Voice of	9730eu	11630al	13740eu				
1900 1930	Hungary, Radio Budapest	7130eu						
1900 1930	Israel, Kol Israel	9435va	11605va 15615va 15640af					
1900 1930		17545va						
1900 1930	Philippines, Radyo Pilipinas	11720pa	15190pa 17720pa					
1900 1930	Switzerland, Swiss R International	6110eu						
1900 1930	Turkey, Voice of	9730as	9785eu					
1900 1945	Germany, Deutsche Welle	11805af 11965af	13720af 15390af					
1900 1945	India, All India Radio	7410as 9950as	11620as 11935as					
1900 1950	New Zealand, R New Zealand Int	13790af 15200af	17670af					
1900 1956	North Korea, Voice of Korea	4405va 6574na 6595na	6615na					
1900 2000		9335na 11710na	13760na					
1900 2000	Anguilla, Caribbean Beacon	11775am						
1900 2000 vl	Australia, ABC/Katherine	2485do						
1900 2000 vl	Australia, ABC/Tennant Creek	2325do						
1900 2000	Australia, Christian Voice	9720as						
1900 2000	Australia, Radio	6080pa 7240va 9500as 9580va						
1900 2000 vl	Botswana, Radio	3356do 4820do						
1900 2000	Bulgaria, Radio	9400eu 11900eu						
1900 2000	Canada, CFRX Toronto ON	6070do						
1900 2000	Canada, CFVP Calgary AB	6030do						
1900 2000	Canada, CHNX Halifax, NS	6130do						
1900 2000	Canada, CKZN St John's NF	6160do						
1900 2000	Canada, CKZU Vancouver BC	6160do						
1900 2000	Canada, CBC Northern Service	9625do						
1900 2000	China China Radio International	6165af 9440af 9585af						
1900 2000	Costa Rica, R for Peace Intl	15049irr 21815ub						
1900 2000	Costa Rica, University Network	5030am 6150am 7375am 9724sa						
1900 2000		11870am 13749na 17645as						
1900 2000	Ecuador, HCJB	17660eu						
1900 2000 mtwhf	Egypt, Radio Africa	15185af						
1900 2000 o/monthly	Finland, Scandv Weekend Radio	11690va						
1900 2000	Germany, Voice of Hope	7290eu						
1900 2000 vl	Ghana, Ghana BC Corp	3366do 4915do						
1900 2000 vl	Italy, Italian Radio Relay Service	3985va 4915irr 4885irr						
1900 2000	Kenya, Kenya BC Corp	4885irr 4915irr 4885irr						
1900 2000	Kuwait, Radio	11990va						
1900 2000 vl	Lesotho, Radio	4800do						
1900 2000 vl	Liberia, ELWA	4760do						
1900 2000 vl	Liberia, R Liberia International	5100do						
1900 2000 osmtwh	Malta, Voice of Mediterranean	12060eu						
1900 2000	Namibia, Namibian BC Corp	3270af 3289af						
1900 2000	Netherlands, Radio	6020af 7120af 9895af 11655af						
1900 2000	New Zealand, ZLXA	13700af 17605af	21590af					
1900 2000 vl		3935do						
1900 2000 vl	Nigeria, Radio/Enugu	6025do						
1900 2000 vl	Nigeria, Radio/Ibadan	6050do						
1900 2000 vl	Nigeria, Radio/Kaduna	4770do 6090do 7275do 9570do						
1900 2000 vl	Nigeria, Radio/Lagos	3326do 4990do						
1900 2000 vl	Nigeria, Voice of	7255af 15120af						
1900 2000	Russia, Voice of Russia WS	9480eu 9685eu 9775eu 9890eu						

2000 UTC - 4PM E / 3PM C / 1PM P

2000 2010	Vatican City, Vatican Radio	4005eu 5885eu 7250eu 9645eu						
2000 2015		9660af 11625af 13765af						
2000 2025	Swaziland, Trans World Radio	3200af						
2000 2025	Netherlands, Radio	6020af 7120af 9895af 11655af						
2000 2025		13700af 17605af 21590af 9525eu						
2000 2027	Poland, Radio Polonia	6035eu 7185eu 7265eu						
2000 2030	Congo, RTV Congolaise	5985do						
2000 2030	Belarus, R Belarus International	7105eu						
2000 2030	Belgium, RVI Flanders R Intl	9925eu						
2000 2030	Iran, VOIR	9022eu						
2000 2030	Papua New Guinea, NBC	4890do						
2000 2030	Poland, Radio Polonia	6035eu						
2000 2030	Sweden, Radio Polonia	6065eu						
2000 2030	Switzerland, Swiss R International	13770af 15220af 17580af 17735af						
2000 2030	Italy, RAI International	5970eu 9750eu						
2000 2030	Armenia, Voice of	4810eu 9960eu						
1950 1950	Vatican City, Vatican Radio	4005eu 5885eu 7250eu 9645eu						
1950 2000	New Zealand, R New Zealand Int	15160pa						
2000 2030		17745af 17895af						
2000 2045	Germany, Deutsche Welle	7130eu						
2000 2045	Iraq, Radio Iraq International	7157irr 9684irr 11785irr 15325eu						
2000 2059	Canada, R Canada International	5959eu 11690eu						
2000 2059		121570eu						
2000 2100	Algeria, R Algiers International	11715eu 11750eu 15160va						
2000 2100	Anguilla, Caribbean Beacon	11775am						
2000 2100	Australia, ABC/Alice Springs	2310do						
2000 2100	Australia, ABC/Katherine	2485do						
2000 2100	Australia, ABC/Tennant Creek	2325do						
2000 2100	Australia, Christian Voice	9720as						
2000 2100	Australia, Radio	9500as 9580va 9815pa 11880va						
2000 2100		12080va						
2000 2100	Botswana, Radio	3356do 4820do						
2000 2100	Canada, CBC Northern Service	6925do						
2000 2100	Canada, CFRX Toronto ON	6070do						
2000 2100	Canada, CFVP Calgary AB	6030do						
2000 2100	Canada, CHNX Halifax, NS	6130do						
2000 2100	Canada, CKZN St John's NF	6160do						
2000 2100	Canada, CKZU Vancouver BC	6160do						
2000 2100	China China Radio International	5965eu 9440af 9840eu 11735af						
2000 2100		13640af						

Shortwave Guide



2000 2100	Costa Rica, R for Peace Intl	15049irr	21815usb		2100 2130	Turkey, Voice of	7170as	
2000 2100	Costa Rica, University Network	5030am	6150am	7375am	2100 2130	UK, BBC World Service	5975am	
		11870am	13749na	9724sa	2100 2130	Yugoslavia, Radio	6100eu	
2000 2100 mtwhf	Eqt Guinea, Radio Africa	15185af			2100 2145	Germany, Deutsche Welle	9670pa	9765pa
2000 2100 o/monthly	Finland, Scandv Weekend Radio	11720va			2100 2156	USA, WYFR Okeechobee FL	13855af	9875af
2000 2100	Germany, Voice of Hope	7290eu			2100 2200	Romania, R Romania International	15120af	11865af
2000 2100 vl	Ghana, Ghana BC Corp	3366do	4915do		2100 2200	Angola, R. Nacional de Angola	3374va	17845af
2000 2100	Indonesia, Voice of	9525eu	11784eu	15149eu	2100 2200	Anguilla, Caribbean Beacon	11775am	18980eu
2000 2100 vl	Italy, Italian Radio Relay Service	3985va			2100 2200	Australia, Christian Voice	9865pa	15365eu
2000 2100	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	2100 2200	Botswana, Radio	3356do	4820do
2000 2100	Kuwait, Radio	11990va			2100 2200	Bulgaria, Radio	9400eu	11900eu
2000 2100 vl	Lesotho, Radio	4800do			2100 2200	Canada, CBC Northern Service	9625do	
2000 2100 vl	Liberia, ELWA	4760do			2100 2200	Canada, CFRX Toronto ON	6070do	
2000 2100 vl	Liberia, R Liberia International	5100do			2100 2200	Canada, CFVP Calgary AB	6030do	
2000 2100	Namibia, Namibian BC Corp	3270af	3289af		2100 2200	Canada, CHNX Halifax, NS	6130do	
2000 2100	New Zealand, R New Zealand Int	15160pa			2100 2200	Canada, CKZN St John's NF	6160do	
2000 2100	New Zealand, ZLXA	3935do	7290do		2100 2200	Canada, CKZU Vancouver BC	6160do	
2000 2100 vl	Nigeria, Radio/Enugu	6025do			2100 2200	Costa Rica, R for Peace Intl	15049irr	21815usb
2000 2100 vl	Nigeria, Radio/Ibadan	6050do			2100 2200	Costa Rica, University Network	5030am	6150am
2000 2100 vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	2100 2200	7375am	7375am	
2000 2100 vl	Nigeria, Radio/Lagos	3326do	4990do		2100 2200	7375as	9724sa	
2000 2100 vl	Nigeria, Voice of	7255af	15120af		2100 2200	Ecuador, HCJB	17660eu	
2000 2100 vl	Papua New Guinea, NBC	4890do			2100 2200	Eqt Guinea, Radio Africa	15185af	
2000 2100	Russia, Voice of Russia WS	9480eu	9775eu	9890eu	2100 2200	Finland, Scandv Weekend Radio	11720va	
		12070eu	15455eu	11675eu	2100 2200	Ghana, Ghana BC Corp	3366do	4915do
2000 2100	Russia, World Beacon	7360eu			2100 2200	India, All India Radio	7150eu	7410eu
2000 2100	S Africa, World Beacon	3230af	9675af	11640af	2100 2200	Italy, Italian Radio Relay Service	3985va	9910au
2000 2100	Sierra Leone, Sierra Leone BS	3316do			2100 2200	Japan, Radio	6035pa	6180eu
2000 2100 vl	Solomon Islands, SIBC	5020do			2100 2200	11855af	11830eu	
2000 2100 mtwhf	Spain, R Exterior Espana	9595af	15290eu		2100 2200	Lesotho, Radio	4800do	
2000 2100	Sri Lanka, Sri Lanka BC Corp	4940irr			2100 2200	Liberia, ELWA	4760do	
2000 2100 vl	Syria, Radio Damascus	12085eu	13610eu		2100 2200	Liberia, R Liberia International	5100do	
2000 2100	Uganda, Radio	4976do	5026do		2100 2200	Namibia, Namibian BC Corp	3270af	3289af
2000 2100	UK, BBC World Service	3255af	5975pa	6005af	2100 2200	New Zealand, R New Zealand Int	15160pa	
		6195eu	9410eu	9630af	2100 2200	New Zealand, ZLXA	3935do	7290do
		11835af	11945as	12095eu	2100 2200	Nigeria, Radio/Enugu	6025do	
		17830af			2100 2200	Nigeria, Radio/Ibadan	6050do	
2000 2100	UK, World Beacon	7420af	9675af		2100 2200	Nigeria, Radio/Kaduna	4770do	6090do
2000 2100	USA, Armed Forces Radio	4278va	4319va	4993va	2100 2200	Nigeria, Radio/Lagos	4990do	7275do
		6350va	6458va	6847va	2100 2200	Papua New Guinea, NBC	4890do	9570do
		10940va	12579va	12689va	2100 2200	Russia, World Beacon	7360eu	
		13362va	16847va		2100 2200	S Africa, World Beacon	3230af	9675af
2000 2100	USA, KAIJ Dallas TX	13815va			2100 2200	Sierra Leone, Sierra Leone BS	3316do	11640af
2000 2100	USA, KJES Vado NM	15385na			2100 2200	Solomon Islands, SIBC	5020do	
2000 2100	USA, KTBN Salt Lake City UT	15590na			2100 2200	Spain, R Exterior Espana	9595af	
2000 2100	USA, KWHR Naalehu HI	17510as			2100 2200	Sri Lanka, Sri Lanka BC Corp	4940irr	
2000 2100	USA, WBCQ Monticello ME	7415na			2100 2200	Syria, Radio Damascus	12085eu	13610eu
2000 2100	USA, WEWN Birmingham AL	11875na	13615na	15745eu	2100 2200	UK, World Beacon	9675af	
2000 2100	USA, WHRA Greenbush ME	17650af			2100 2200	Ukraine, R Ukraine International	5905eu	11705eu
2000 2100	USA, WHRI Noblesville IN	5745va	9495am		2100 2200	USA, Armed Forces Radio	4278va	4319va
2000 2100	USA, WINB Red Lion PA	13570am			2100 2200	6350va	6458va	
2000 2100	USA, WJCR Upton KY	7490am	13595as		2100 2200	10940va	12579va	
2000 2100	USA, WMLK Bethel PA	15265eu			2100 2200	13362va	16847va	
2000 2100 smtwhf	USA, WRMI Miami FL	15724na			2100 2200	USA, KAIJ Dallas TX	13815va	
2000 2100	USA, WRNO New Orleans LA	7395am	15420al		2100 2200	USA, KTBN Salt Lake City UT	15590na	
2000 2100	USA, WTJC Newport NC	9370na			2100 2200	USA, KWHR Naalehu HI	17510as	
2000 2100	USA, WWCR Nashville TN	9475na	12160na	13845na	2100 2200	USA, Voice of America	6035pa	6040me
2000 2100	USA, WWFV McCaysville GA	12172va	17845af	18980eu	2100 2200	USA, WBCQ Monticello ME	7415na	9735af
2000 2100 vl	Vanuatu, Radio	3945do	4960do	7260do	2100 2200	USA, WBCQ Monticello ME	9530af	9760eu
2000 2100	Zambia, Christian Voice	4965do			2100 2200	USA, WEWN Birmingham AL	11875na	15745eu
2000 2100 vl	Zambia, National BC Corp	6165do	6265do		2100 2200	USA, WHRA Greenbush ME	17650af	
2000 2100 vl	Zimbabwe, Zimbabwe BC Corp	4828do	6045do		2100 2200	USA, WHRI Noblesville IN	5745va	9495am
2000 2100	USA, WSHB Cypress Crk SC	15665va	18910af		2100 2200	USA, WINB Red Lion PA	13570am	
2010 2030	Vatican City, Vatican Radio	9660af	11625af	13765af	2100 2200	USA, WJCR Upton KY	7490am	13595as
2025 2045	Italy, RAI International	7125af	9635af	11880af	2100 2200	USA, WRMI Miami FL	15724na	
2030 2045 vl	Libya, Voice of Africa	11815af	15435af	17725af	2100 2200	USA, WRNO New Orleans LA	7395am	15420al
2030 2045	Thailand, Radio	9655eu	9680eu	11905eu	2100 2200	USA, WSHB Cypress Crk SC	15665va	18910af
2030 2057	Vietnam, Voice of	9730eu	11630al	13740eu	2100 2200	USA, WTJC Newport NC	9370na	
2030 2100 th	Belarus, R Belarus International	7105eu	7210eu		2100 2200	USA, WWCR Nashville TN	9475na	12160na
2030 2100	Cuba, Radio Havana	13660eu	13750eu		2100 2200	USA, WWFV McCaysville GA	12172va	13845na
2030 2100	Ecuador, HCJB	17660eu	21455usb		2100 2200	Vanuatu, Radio	3945do	4960do
2030 2100	Egypt, Radio Cairo	15375af			2100 2200	Zambia, Christian Voice	4965do	6265do
2030 2100	S Africa, Adv World Radio Africa	9745af			2100 2200	Zambia, National BC Corp	4828do	6045do
2030 2100	Turkey, Voice of	7170as			2100 2200	UK, BBC Caribbean Report	5975ca	11675ca
2030 2100 f	UK, Wales Radio Intl/Merlin	7325eu			2100 2200	Egypt, Radio Cairo	9990eu	15375af
2030 2100	USA, Voice of America	6035af	6095me	7375af	2100 2200	Greece, Voice of	9425au	15650au
		9760af	9770af	11975af	2100 2200	UK, BBC Calling Falklands	11680sa	
		15445af	15580af	17745af	2100 2200	Czech Rep, Radio Prague Intl	11600au	15545af
2030 2100as USA, Voice of America		4950eu	9545eu		2100 2200	Albania, R Tirana International	7130eu	9540eu
2030 2100	Uzbekistan, Radio Tashkent	9540eu	9545eu		2100 2200	Australia, ABC/Alice Springs	4835do	
2045 2100	India, All India Radio	7150au	7410eu	9650eu	2100 2200	Australia, ABC/Katherine	5025do	
		9950eu	11620au	11715au	2100 2200	Australia, ABC/Tennant Creek	4910do	
					2100 2200	Australia, Radio	7240va	9660pa
					2100 2200	Austria, R Austria International	5945eu	6155eu
					2100 2200	Guam, KSDA/ Adventist World R	11980as	15240as
					2100 2200	Hungary, Radio Budapest	3975eu	
					2100 2200	Iran, VOIR	9570as	13745as
					2100 2200	South Korea, R Korea Intl	15575eu	
					2100 2200	Sweden, Radio	6065eu	15255as
					2100 2200	Uzbekistan, Radio Tashkent	7105eu	9540eu
					2100 2200	USA, WYFR Okeechobee FL	13855af	15120af

2100 UTC - 5PM E / 4PM C / 2PM P

2100 2110	Kenya, Kenya BC Corp	4885irr	4915irr	4885irr	2130 2200	Austria, R Austria International	5945eu	6155eu
2100 2115	Egypt, Radio Cairo	15375af			2130 2200	Guam, KSDA/ Adventist World R	11980as	15240as
2100 2130 vl	Australia, ABC/Alice Springs	2310do			2130 2200	Hungary, Radio Budapest	3975eu	
2100 2130 vl	Australia, ABC/Katherine	2485do			2130 2200	Iran, VOIR	9570as	13745as
2100 2130 vl	Australia, ABC/Tennant Creek	2325do			2130 2200	South Korea, R Korea Intl	15575eu	
2100 2130	Australia, Radio	7240va	9500as	9580va	2130 2200	Sweden, Radio	6065eu	15255as
		11880va	12080va	17715va	2130 2200	Uzbekistan, Radio Tashkent	7105eu	9540eu
					2130 2200	USA, WYFR Okeechobee FL	13855af	15120af
2100 2130	Austria, AWR Europe	15165af			2145 2200			
2100 2130	China China Radio International	5965eu	9840eu	11735af				
2100 2130	Cuba, Radio Havana	13660eu	13750eu	13640af				
2100 2130	South Korea, R Korea Intl	3975eu	15575eu					

Shortwave Guide



2200 UTC - 6PM E / 5PM C / 3PM P

2200	2210	vl	Zambia, National BC Corp	6165do	6265do				
2200	2215		New Zealand, R New Zealand Int	15160pa					
2200	2220	s	Greece, Voice of	9425au	15650au				
2200	2225		Italy, RAI International	9675as	11900as	15240as			
2200	2230		Canada, R Canada International	9755am	13670am	17695am			
2200	2230	mtwhf	Canada, R Canada International	15305am	17880am				
2200	2230		India, All India Radio	7150au	7410eu	9650eu	9910au		
				9950eu	11620au	11715au			
2200	2230		Iran, VOIRI	9570as	13745as				
2200	2230		Mexico, R Mexico International	9705am	11770am				
2200	2230	vl	Papua New Guinea, NBC	4890do					
2200	2230	mtwhf	USA, Voice of America	5855af	6035af	7375af	7415af		
				11975af					
2200	2230	mtwhfa	Yugoslavia, Radio	7230au					
2200	2245		Egypt, Radio Cairo	9990eu					
2200	2245		USA, WYFR Okeechobee FL	11740na	15120af	17845af			
2200	2300		Anguilla, Caribbean Beacon	6090am					
2200	2300	vl	Australia, ABC/Alice Springs	4835do					
2200	2300	vl	Australia, ABC/Katherine	5025do					
2200	2300	vl	Australia, ABC/Tennant Creek	4910do					
2200	2300		Australia, Christian Voice	9865pa					
2200	2300		Australia, Radio	11880as	15240as	17715va	17795va		
				21740va					
2200	2300		Canada, CBC Northern Service	9625do					
2200	2300		Canada, CFRX Toronto ON	6070do					
2200	2300		Canada, CFVP Calgary AB	6030do					
2200	2300		Canada, CHNX Halifax, NS	6130do					
2200	2300		Canada, CKZN St John's NF	6160do					
2200	2300		Canada, CKZU Vancouver BC	6160do					
2200	2300		China China Radio International	5970na					
2200	2300		Costa Rica, R for Peace Intl	15049irr	21815usb			21815usb	
2200	2300		Costa Rica, University Network	5030am	6150am	7375am	9724sa	5030am	6150am
				11870am	13749na			11870am	13749na
2200	2300	mtwhf	Egypt, Radio Africa	15185af				17645as	17645as
2200	2300	f/monthly	Finland, Scandy Weekend Radio	11690va					
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do				
2200	2300	fas/vl	Italy, Italian Radio Relay Service	3985va					
2200	2300	vl	Liberia, R Liberia International	5100do					
2200	2300		Malaysia, Radio	7295do					
2200	2300		Namibia, Namibian BC Corp	3270af	3289af				
2200	2300		New Zealand, ZLXA	3935do	7290do				
2200	2300	vl	Nigeria, Radio/Enugu	6025do					
2200	2300	vl	Nigeria, Radio/Ibadan	6050do					
2200	2300	vl	Nigeria, Radio/Kaduna	4770do	6090do	7275do	9570do		
2200	2300	vl	Nigeria, Radio/Lagos	3326do	4990do				
2200	2300		Sierra Leone, Sierra Leone BS	3316do					
2200	2300		Solomon Islands, SIBC	5020do	9545do				
2200	2300		Sri Lanka, Sri Lanka BC Corp	4940irr					
2200	2300		Taiwan, Radio Taipei International	11565eu	15600eu				
2200	2300		Turkey, Voice of	7190va	11845va				
2200	2300		UK, BBC World Service	5965as	5975am	6175na	6195va	5975as	6035as
				9590na	9660as	11835af		6175na	6195as
				11955as	12095as			6195as	62095as
2200	2300		USA, Armed Forces Radio	4278va	4319va	4993va	5765va	4278va	4319va
				6350va	6458va	6847va	10320va	6350va	6458va
				10940va	12579va	12689va	13254va	10940va	12579va
				13362va	16847va			13362va	16847va
2200	2300		USA, KAI Dallas TX	13815va					
2200	2300		USA, KBTN Salt Lake City UT	15590na					
2200	2300		USA, KWHR Naahehu HI	17510as					
2200	2300		USA, Voice of America	7215as	9705as	9770as	11760as	7190as	7200as
				15185as	15290as	15305as	17820as	15185as	15290as
2200	2300	mtwhf	USA, WBCQ Monticello ME	9335na				7145na	
2200	2300		USA, WBCQ Monticello ME	7415na				9335na	
2200	2300		USA, WEWN Birmingham AL	9385na	9975eu	13615na		9385na	9975eu
2200	2300		USA, WHRA Greenbush ME	7580eu				7580eu	
2200	2300		USA, WHRI Noblesville IN	5745va	9495am			5745va	9495am
2200	2300		USA, WINB Red Lion PA	13570am				13570am	
2200	2300		USA, WJCR Upton KY	7490am	13595as			7490am	13595as
2200	2300	as	USA, WRMJ Miami FL	9955am				9955am	
2200	2300		USA, WRNO New Orleans LA	7395am	15420al			7355va	
2200	2300		USA, WSHB Cypress Crk SC	13770eu	15285sa			13770eu	15285sa
2200	2300		USA, WTJC Newport NC	9370na				9370na	
2200	2300		USA, WWFB Nashville TN	7435na	9475na	12160na	13845na	7435na	9475na
2200	2300		USA, WWFV McCaysville GA	5085va	12172va			5085va	6890va
2200	2300	vl	Vanuatu, Radio	3945do	4960do	7260do		3945do	4960do
2200	2300		Zambia, Christian Voice	4965do				4965do	
2215	2300		New Zealand, R New Zealand Int	17675pa				6025do	
2230	2257		Czech Rep, Radio Prague Intl	1160na	15445na			6050do	
2230	2300		Belgium, RVI Flanders R Int'l	15565na				4770do	6090do
2230	2300		Canada, R Canada International	9755am	13670am	17695am		3326do	4990do
2230	2300		Cuba, Radio Havana	9550am				9660pa	11880as
2230	2300	vl	Papua New Guinea, NBC	4890do	11880irr			11715va	12080va
2230	2300	vl/as	Solomon Islands, SIBC	5020do				11715va	12080va
2230	2300	vl/a	Solomon Islands, SIBC	9545do				11715va	12080va
2245	2300		India, All India Radio	9705as	9950as	11620as	13605as	11715va	12080va
2245	2300		USA, WYFR Okeechobee FL	11740na				11715va	12080va

2300 UTC - 7PM E / 6PM C / 4PM P

2300	0300	sm f	USA, WINB Red Lion PA	12160am					
2300	0000		Anguilla, Caribbean Beacon	6090am					
2300	0000	vl	Australia, ABC/Alice Springs	4835do					
2300	0000	vl	Australia, ABC/Katherine	5025do					
2300	0000	vl	Australia, ABC/Tennant Creek	4910do					
2300	0000		Australia, Christian Voice	9865pa					
2300	0000	vl	Bulgaria, Radio	9400na	11700na				
2300	0000		Cameroon, CRTV Radio Buea	6005do					
2300	0000		Canada, CBC Northern Service	9625do					
2300	0000		Canada, CFRX Toronto ON	6070do					
2300	0000		Canada, CFVP Calgary AB	6030do					
2300	0000		Canada, CHNX Halifax, NS	6130do					
2300	0000		Canada, CKZN St John's NF	6160do					
2300	0000		Canada, CKZU Vancouver BC	6160do					
2300	0000		China China Radio International	5970na					
2300	0000		Costa Rica, R for Peace Intl	15049irr	21815usb			21815usb	
2300	0000		Costa Rica, University Network	5030am	6150am	7375am	9925sa	5030am	6150am
				11870am	13749na			11870am	13749na
2300	0000		Ecuador, HCJB	17660as					
2300	0000		Egypt, Radio Cairo	9900am					
2300	0000	f/monthly	Finland, Scandy Weekend Radio	11690va	13645as			13645as	
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do				
2300	0000		Iceland, RTM Reykjavik	5980do					
2300	0000		Namibia, Namibian BC Corp	3270af	3289af			3289af	
2300	0000		New Zealand, ZLXA	3935do	7290do				
2300	0000		China, Radio China International	5970na					
2300	0000		Malaysia, Radio Kuala Lumpur	6005do					
2300	0000		Malta, Radio La Valletta	6050do					
2300	0000		Monaco, Radio Monaco	6105do					
2300	0000		Myanmar, Radio Yangon	6150do					
2300	0000		North Korea, Radio Pyongyang	6205do					
2300	0000		Oman, Radio Muscat	6250do					
2300	0000		Pakistan, Radio Islamabad	6300do					
2300	0000		Peru, Radio Lima	6350do					
2300	0000		Philippines, Radio Manila	6400do					
2300	0000		Poland, Radio Warsaw	6450do					
2300	0000		Portugal, Radio里斯本	6500do					
2300	0000		Russia, Radio Moscow	6550do					
2300	0000		Senegal, Radio Dakar	6600do					
2300	0000		South Africa, Radio Pretoria	6650do					
2300	0000		Spain, Radio Madrid	6700do					
2300	0000		Sweden, Radio Stockholm	6750do					
2300	0000		Switzerland, Radio Bern	6800do					
2300	0000		Thailand, Radio Bangkok	6850do					
2300	0000		Tunisia, Radio Tunis	6900do					
2300	0000		Ukraine, Radio Kiev	6950do					
2300	0000		United Kingdom, Radio London	7000do					
2300	0000		United States, Radio Washington	7050do					
2300	0000		Uruguay, Radio Montevideo	7100do					
2300	0000		Venezuela, Radio Caracas	7150do					
2300	0000		Yemen, Radio Sana'a	7200do					
2300	0000		Zimbabwe, Radio Harare	7250do					
2300	0000		Algeria, Radio Algiers	7300do					
2300	0000		Angola, Radio Luanda	7350do					
2300	0000		Chad, Radio N'Djamena	7400do					
2300	0000		China, Radio Beijing	7450do					
2300	0000		China, Radio Shanghai	7500do					
2300	0000		China, Radio Wuhan	7550do					

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BBC World Service (am)

0000 S/M World Briefing, T-A News; **0005** T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); **0020** S/M Sports Roundup; **0030** S Arts in Action, M The World Today, T Music Mix, W UK Top 20, H/A Westway (drama serial), F World of Music; **0045** H UK Album Chart, A Music X-Press.

HCJB, Ecuador

0000 S Did You Hear?, M Hour of Decision, T-A Insight for Living; **0028** T-A Money Minute; **0030** S Saludos Amigos, M Mountain Meditations, T-A New Beginning; **0056** A Slice of Infinity.

Radio Australia

0000 D News; **0005** S The Europeans, A Feedback (letters/station news); **0010** M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); **0030** A Bush Telegraph (rural life).

Radio Netherlands

0000 S Aural Tapestry (cultural threads), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Basement Sessions (classic jazz performances), A A Good Life (global development); **0030** S Roughly Speaking (youth culture), M Aural Tapestry, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

Radio Japan

0000 D News; **0010** S Hello from Tokyo (listener contact), M Weekend Square; **0015** T-A 44 Minutes (feature magazine).

Radio New Zealand International

0000 S/A RNZ News; M-F Midday Report; **0012** S This Week in Parliament, A Focus on Politics; **0033** S Spectrum (life in NZ), A The Sampler (latest CDs).

Radio Prague

0000 D News; **0005** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0010** S Saturday Music (classical/folk/jazz), M The Arts; **0015** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; **0020** W Talking Point, F Economic Report.

Voice of America (News Now)

0000 T-A World News; **0010** T-A Regional News; **0014** T-A USA News; **0018** T-A Sports; **0022** T-A Features; **0030** T-A World News; **0033** T Encounter, W Our World, H Kaleidoscope, F Best of 'Talk to America' A Press Conference USA.

WBCQ, Maine

7415 kHz.: **0000** S A Different Kind of Oldies Show, M Radio New York International, H Idio-Audio, F Radio Detective (antique radio), A Allan Weiner Worldwide. 9335 kHz.: **0000** S Pagan Poupourri.

WHRI, Indiana

7580 kHz.: **0000** A 20 The Countdown Magazine (from F 2300).

WWCR, Tennessee

5070 kHz.: **0030** F Ken's Country Classics.

0100 UTC - Page 43 Freqs

BBC World Service (am)

0100 S The World Today, M-A News; **0105** M Wright Around the World (musical variety), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Discovery (science); **0130** S Reporting Religion, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places, A Essential Guide; **0145** S Letter from America (Alistair Cooke comments).

China Radio International

0100 D News; **0110** S Report on Developing Countries, M-F Current Affairs, A Global Review; **0120** S In the Spotlight (cultural magazine), A Listeners' Garden; **0130** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0100 D News; **0105** S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); **0115** S Inside Europe, M Arts on the Air; **0130** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0100 D Latin American & World News; **0110** S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); **0130** T Inside HCJB, W Saludos Amigos, H Ham Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia

0100 D News; **0105** S Correspondents' Report, A Asia Pacific (regional current affairs); **0110** M-F Asia Pacific; **0130** S Oz Sounds (new releases), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A Arts Talk.

Radio Budapest

0100 D News; **0110** S DX Blockbuster, M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Canada International

0100 D News; **0108** S Canada Newsweek, M Maple Leaf Mailbag, T-S Canada Today (current events magazine); **0130** S Canada Review (business/tech edition), M Canada Review (arts edition).

Radio Habana Cuba

0100 D International News; **0110** M Weekly Review, T-S National News; **0115** T-S Viewpoint; **0130** M RHC 40 Years, T-S News Bulletin; **0135** T-A Time Out (sports); **0140** S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; **0150** M Breakthrough (science report).

Radio Netherlands

0100 S/M News, T-A Newsline; **0105** S Europe Unzipped, M Wide Angle (week in review).

Radio New Zealand International

0100 D RNZ News; **0106** S Books at One, M-F Cadenza (light classics), A Home Grown (NZ music, including Musical Chairs-artist feature 0030); **0130** S Future Indicative (for disabled).

Radio Prague

0100 D News; **0105** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0110** S Saturday Music (classical/folk/jazz), M The Arts; **0115** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; **0120** W Talking Point, F Economic Report.

Swiss Radio International

0100 D Newsnet (Swiss magazine); **0110** S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); **0115** H Book Zone (2nd H only), A Business Spotlight; **0130** D Newsnet (Swiss magazine); **0140** S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); **0145** H

Hauser's Highlights

BANGLADESH: Bangladesh Betar External Service

UT	Service	KHz	Zone
1200-1300	G.O.S. (Eng.)	7185 9550	S&SE Asia
1315-1345	Nepalese	7185 9550	Nepal
1400-1430	Urdu	7185 9550	Pakistan
1515-1545	Hindi	7185 9550	India
1600-1630	Arabic	7185 9550	Middle East
1630-1730	Bengali	7185 9550	Middle East
1745-1815	V. of Islam (Eng.)	7185 9550 15520	Europe
1815-1900	G.O.S. (Eng.)	7185 9550 15520	Europe
1915-2000	Bengali	7185 9550 15520	Europe
Reports To : Senior Engineer (Research Wing), National Broadcasting authority, Bangladesh Betar, 121 Kazi Nazrul Islam Avenue, Shahbag, Dhaka-1000, Bangladesh. E-mail: rrc@aitlbd.net (Rifat J. Eusufzai, DX Forum, DX Listening Digest)			

Book Zone (2nd only), A Business Spotlight.

Voice of America (News Now)

0100 T-A World News; **0110** T-A Regional News; **0114** T-A USA News; **0118** T-A Sports; **0122** T-A Features; **0130** T-A World News, **0133** A Communications World; **0136** T-F Dateline (news magazine); **0145** T-F Science; **0149** T-F Business; **0154** T-F Feature.

Voice of Russia

0100 D News; **0111** S News & Views, M Sunday Panorama, T-A Commonwealth Update; **0124** M Russia: People & Events; **0130** D News in Brief; **0132** S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Science & Engineering, A Christian Message from Moscow; **0146** F Music At Your Request; **0154** H Russia: People & Events.

Voice of Vietnam

0100 D News; **0105** D Current Affairs; **0110** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0115** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0120** S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: **0100** S Marion's Attic (vintage recordings). 9335 kHz.: **0100** S Bedtime Revelation Stories.

WHRI, Indiana

7315 kHz.: **0105** M Music (Christian contemporary and gospel)

WWCR, Tennessee

3215 kHz.: **0105** T-A Golden Age of Radio Theatre. 5070 kHz.: **0130** A New Horizons (science); **0145** S Ask WWCR (letters).

Radio Austria International

0130 D Report from Austria (magazine); **0135** S Week in Review, M Radio E; **0150** S Listener Letters.

RTE, Ireland

0130 S/M Sportsnews; T-A The News at Six.

Voice of America (Special English)

0130 T-A News; **0140** T Agriculture Today, W/H Science Report, F Environment Report, A in the News; **0145** T Science in the News, W Explorations, H Making of a Nation, F American Mosaic; A American Stories.

0200 UTC - Page 44 Freqs

BBC World Service (am)

0200 D The World Today; **0230** S From Our Own Correspondent, M Assignment, T-A World Business Report; **0245** T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (me)

0200 D The World Today; **0230** S From Our Own Correspondent, A Global Business.

HCJB, Ecuador

0200 S Ham Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archaeology), H Adventures in Odyssey (Christian stories for children), F Viewpoint (issues), A Walkin' in the Sunshine (country music); **0215** W Words for Women; **0230** S Just Jazz, T-A Back to the Bible.

Radio Australia

0200 D News; **0205** S Margaret Throsby (interviews and music), A Ockham's Razor (a science issue); **0210** M-F The World Today (ABC Radio flagship news program); **0230** A Earthbeat (ecology).

[Special service: **0205** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0200 D International News; **0210** M From Habana, T-S National News; **0215** T-S Reports and music; **0230** M The Jazz Place, T-S News Bulletin; **0235** S World of Stamps, T-A Reports and music; **0245** S RHC 40 Years; **0250** S Cuban music.

Radio Korea International

0200 D News; **0210** S Seoul Report (week in review), M Korean Pop Interactive

Shortwave Guide



(requests), T-A News Commentary; **0215** T-A Seoul Calling (magazine); **0230** S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Exploring the New Millennium, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

Radio New Zealand International

0200 D RNZ News; **0205** S Eureka! (science)*, M-F In Touch with New Zealand (music/variety), A Home Grown (cont'd. from 0106)*; **0230** S Feature program or series*. [*may be preempted by live sport].

Radio Taipei International

0200 D News; **0215** S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Taiwan Culture, W Taiwan Today, H Journey into Chinese Culture, F Taipei Magazine, A Kaleidoscope (life in Taiwan); **0230** T Trends, W Confucius Confusion, H Life Unusual, F East Meets West (visitors), A Naluwan; **0245** S Mailbag Time, M-A Let's Learn Chinese.

Voice of Russia

0200 D News; **0211** S/M/H Moscow Mailbag, T/F Science & Engineering, W/A Newmarket (business); **0230** D News in Brief; **0232** S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); **0246** S You Write to Moscow; **0254** W Russia: People & Events.

WBCQ, Maine

7415 kHz.: **0200** S Magic Radio.
9335 kHz.: **0200** S World of Radio.

WHRI, Indiana

7315 kHz.: **0205** M-A Music (Christian contemporary and gospel).

Radio Budapest

0230 D News; **0240** S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

Radio Sweden

0230 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0245** T Sports Scan, W Media Scan (1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Swiss Radio International

0230 D Newsnet (Swiss magazine); **0240** S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); **0245** H Book Zone (2nd only), A Business Spotlight.

Voice of Vietnam

0230 D News; **0235** D Current Affairs; **0240** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0245** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0250** S Music, A Literature and Arts.

Hauser's Highlights

FRANCE:

0400-0430 Af	15.155
0500-0530 Af	17.800
0600-0630 Af	17.800 21.620
0700-0800 Af	15.605
1200-1230 EuAf	15.540 25.820
1400-1500 MEAs	11.610 17.620
1600-1700 Af	11.615 11.995 12.015 15.605 17.605 17.850
1700-1730 Af	15.605 17.605

(© BBC Monitoring)

Radio France International via Moyabi, Gabon, until Sept 2 includes English: 0400-0430 9550, 0500-0530 11685, 0600-0630 11710 (*Observer*, Bulgaria) Omitted from schedule above!

WWCR, Tennessee

3215 kHz.: **0230** A World of Radio.
5070 kHz.: **0200** S Communications World; **0230** S World of Radio.

300 UTC - Page 44 Freqs

BBC World Service (am)

0300 S/M World Briefing, T-A News; **0305** T Panel Game or Quiz, W The Alternative (music), H Greenfield Collection (classical music), F Jazzmatazz, A Composer of the Month; **0320** S/M Sports Roundup; **0330** S Science in Action, M Westway Omnibus (drama serial), T Body & Mind (health), W Patterns of Faith, H A Radio History of the World, F Heart & Soul (religion), A Write On (letters) or From Where I Stand (British views); **0345** T-A Off the Shelf (book readings).

BBC World Service (me)

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Science in Action, M World Business Review, T-A World Business Report; **0345** M Write On or From Where I Stand (British views), T/W/F/A Analysis, H From Our Own Correspondent.

BBC World Service (esaf)(wcaf)

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Postmark Africa, M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (sas)

0300 S World Briefing, M-A News; **0305** M Talking Point, T-A Outlook; **0320** S Sports Roundup; **0330** S Science in Action; **0345** M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

Channel Africa

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0300 D News; **0310** S Report on Developing Countries, M-F Current Affairs, A Global Review; **0320** S In the Spotlight (cultural magazine), A Listeners' Garden; **0330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0300 D News; **0305** S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); **0315** S Spectrum (sci/tech), M Arts on the Air; **0330** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCIJ, Ecuador

0300 S Rock Solid, M The Sower, T-A Hope for the Heart; **0313** T-A Getting the Message; **0315** M The Word Today, T-A Rendezvous (inspirational music); **0330** M Renewing Your Mind, T Unshackled (radio's oldest drama series), W Science, Scripture and Salvation, H The Living Word, F Otaachimow, A Inspirational Classics (liturgical music); **0345** W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

Radio Australia

0300 D News; **0305** S Feedback (letters/station news), A Rural Reporter; **0310** M-F Regional Sports Report; **0320** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0330** S Ockham's Razor (a science issue), A Educational series; **0340** M Oz Music Show (rock), T/F Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), H Australian Country Style.

[**Special service:** **0305** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0300 D International News; **0310** M Weekly Review, T-S National News; **0315** T-S Viewpoint; **0330** M RHC 40 Years, T-S News Bulletin; **0335** T-A Time Out (sports); **0340** S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; **0350** M Breakthrough (science report).

Radio New Zealand International

0300 S/A RNZ News*, M-F Pacific Regional News; **0305** S Playhouse (radio theatre)*, A World of Music (BBC)*, **0308** M Tagata o te Moana (Pacific culture), T Top 5, W Pacific Report, H Mailbox or RNZI Talk (meet the RNZI staff), F Dateline Pacific, **0330** T New Releases, W Tradewinds, H The World in Sport, F Pacific Correspondent. [*may be preempted by live sport].

Radio Prague

0300 D News; **0305** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0310** S Saturday Music (classical/folk/jazz), M The Arts; **0315** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine, **0320** W Talking Point, F Economic Report.

Radio Taipei International

0300 D News; **0315** S Great Wall Forum, M Taiwan Economic Journal, T Taiwan Culture, W Taiwan Today, H Soundbite, F New Music Lounge, A Kaleidoscope; **0330** M People, T Trends, W Confucius Confusion, H Life Unusual, F Business Chinese, A Maibag Time; **0345** S Asia Pacific, M-A Let's Learn Chinese.

Voice of Russia

0300 D News; **0311** M Sunday Panorama, T-S News & Views; **0324** M Russia: People & Events; **0330** D News in Brief; **0332** S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century: Footprints in History, W/F Russian history/culture.

WBCQ, Maine

7415 kHz.: **0300** S The Big Kaboom.

WHRI, Indiana

5745 kHz.: **0300** S DXing with Cumbre, M Joe 2K; **0330** S Joe 2K.
7315 kHz.: **0305** S/M 20, The Countdown Magazine (Christian rock music charts)
7580 kHz.: **0305** M-A Music (Christian contemporary and gospel); **0335** S Music (Christian contemporary and gospel)

WWCR Tennessee

3215 kHz.: **0305** M America's Greatest Heroes; **0310** M Profiles.
5070 kHz.: **0300** A Spectrum (communications discussion); **0330** M The Old Record Shop (vintage recordings).

Radio Sweden

0330 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0345** T Sports Scan, W Media Scan (1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

Voice of Vietnam

0330 D News; **0335** D Current Affairs; **0340** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0345** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0350** S Music, A Literature and Arts.

400 UTC - Page 45 Freqs

BBC World Service (eu)

0400 D The World Today; **0430** S Global Business, A Weekend; **0450** M-F Sports Roundup.

BBC World Service (me)

0400 D The World Today; **0430** S In Praise of God, A Assignment; **0450** M-F Sports Roundup.

Hauser's Highlights

NEW ZEALAND: RNZI Schedule

1650-1850	6095	Mon-Fr	NE Pacific, Cooks, Niue, Tonga, Samoa
1851-1950	11725	Daily	All Pacific
1951-2115	15160	Daily	All Pacific
2216-0458	17675	Daily	All Pacific
0459-0705	11725	Daily	All Pacific
0706-1105	9885	Daily	All Pacific
1106-1305	11675	Daily	NW Pacific, Bougainville, East Timor/Asia
1305-1650	6095	Occasional use for sports or weather (Adrian Sainsbury, Frequency Manager, Radio New Zealand International, http://www.rnzi.com)	

Shortwave Guide



BBC World Service (esof)

0400 D The World Today; 0430 S The Story of Africa, M-F Network Africa, A Talkabout Africa.

BBC World Service (wcaf)

0400 D The World Today; 0430 S The Story of Africa, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas)

0400 S/A The World Today, M-F News; 0405 M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian Writing, F Omnibus (documentary); 0430 S In Praise of God, M Music Mix, T UK Top 20, W/F Westway (soap opera), H World of Music, A Assignment; 0445 W UK Album Chart, F Music X-Press.

Channel Africa

0400 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0400 D News; 0410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0420 S In the Spotlight (cultural magazine), A Listeners' Garden; 0430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

0400 D Latin American & World News; 0410 S DX Partyline, M Musical Mailbag, T-A Studio 9 (Latin American regional report); 0430 T Inside HCJB, W Saludos Amigos, H Ham Radio Today, F Woman to Woman, A Musica del Ecuador.

Radio Australia

0400 D News; 0405 S/A Pacific Focus (S arts, A environment); 0410 M-F Margaret Throsby (interviews and music); 0430 S Arts Talk, A Jazz Notes.

[Special service: 0405 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0400 D International News; 0410 M From Habana, T-S National News; 0415 T-S Reports and music; 0430 M The Jazz Place, T-S News Bulletin; 0435 S World of Stamps, T-A Reports and music; 0445 S RHC 40 Years; 0450 S Cuban music.

Radio Netherlands

0430 S/M News; T-A Newsline; 0435 S Europe Unzipped, M Sincerely Yours (letters); 0455 S Insight (commentary).

Radio New Zealand International

0400 D RNZ News; 0408 S A Question of Religion, M-F In Touch with New Zealand (from 0205), A Music feature or series.

Radio Vlaanderen International

0400 S Music from Flanders, M Radio World, T-A News; 0404 T-A Belgium Today; 0408 M Tourism in Flanders, T-A Press Review; 0413 T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; 0414 M Brussels 1043 (letters); 0418 T Sports, H Around Town, F International Report, A Tourism in Flanders; 0424 M-A Soundbox (Flemish rock).

Swiss Radio International

0400 D Newsnet (Swiss magazine); 0410 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0415 H Book Zone (2nd only), A Business Spotlight; 0430 D Newsnet (Swiss magazine); 0440 S Name Game (Swiss geography quiz-1st week) or Capital Letters (2nd/4th) or Sounds Good (Swiss music-3rd/5th), M Swiss Scene (includes Postcards from Switzerland-1st & Book Zone-3rd); 0445 H Book Zone (2nd only), A Business Spotlight.

Voice of Russia

0400 D News; 0411 S/M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); 0430 D News in Brief; 0432 S Moscow Yesterday and Today, M Jazz Show, T Yours for the Asking, W Musical Portraits of the 20th Century, H Folk Box, F Audio Book Club (Russian lit.), A Timelines; 0446 T Music At Your Request, W Russia: People & Events.

WBCQ, Maine

7315 kHz. 0400 S Tom & Darryl (electronic media), M-A Amos 'n Andy.

WHRI, Indiana

5745 kHz.: 0405 S Music (Christian contemporary and gospel), 0430 S DXing with Cumbre.
7315 kHz.: 0400 S 20, The Countdown Magazine (from 0305); 0405 M-F Music (Christian contemporary and gospel).

WWCR, Tennessee

3210 kHz.: 0400 T-S Worldwide Country Radio (country music).
5070 kHz.: 0430 M New Horizons (science/technology); 0445 M Ask WWCR (letters).

0500 UTC - Page 45 Freqs

BBC World Service (eu)

0500 D The World Today; 0530 S Reporting Religion, A Arts in Action.

BBC World Service (me)

0500 D The World Today; 0530 S Global Business, A Arts in Action.

BBC World Service (esof)

0500 D The World Today; 0530 S Arbeat, M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (wcaf)

0500 D The World Today; 0530 S Arbeat, M-F Network Africa, A Talkabout Africa.

BBC World Service (sas)

0500 S The World Today, M-A News; 0505 M One Planet (ecology), T Discovery (science), W Health Matters, H Science View, F Sports International, A Wright Around the World (music requests); 0530 S Reporting Religion, M People and Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World.

BBC World Service (eas)

0500 D The World Today; 0530 S Write On or From Where I Stand (British views), A Arts in Action.

Channel Africa

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

China Radio International

0500 D News; 0510 S Report on Developing Countries, M-F Current Affairs, A Global Review; 0520 S In the Spotlight (cultural magazine), A Listeners' Garden; 0530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Deutsche Welle

0500 D News; 0505 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0515 S Marks & Markets, M COOL! (youth magazine); 0530 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCJB, Ecuador

0500 S Ham Radio Today, M Sunday Nite, T Let My People Think, W The Book & the Spade (archaeology), H Adventures in Odyssey (Christian stories for children), F Inspirational Classics (liturgical music), A Walkin' in the Sunshine (country music); 0515 W Words for Women; 0530 S Just Jazz, T-A New Beginning; 0556 T-A Slice of Infinity.

Radio Australia

0500 D News; 0505 S/A Pacific Focus (S business, A sport); 0510 M-F Pacific Beat (Pacific islands magazine with regional sports report @ 0530); 0530

Hauser's Highlights

SINGAPORE: R Singapore International:

Chinese	1100-1400	6000	9560
English	1100-1400	6150	9600
Indonesian	1200-1400	9665	
Malay	0900-1200	7235	9665

From 1200, 7235 relays domestic Warna 94.2 FM in Malay (Alan Davies, East Malaysia, BC-DX)

S Fine Music Australia (classical), A Lingua Franca (about language); 0545 A Short Story.

[Special service: 0505 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0500 D International News; 0510 M Weekly Review, T-S National News; 0515 T-S Viewpoint; 0530 M RHC 40 Years, T-S News Bulletin; 0535 T-A Time Out (sports); 0540 S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; 0550 M Breakthrough (science report).

Radio Japan

0500 D News; 0510 S Pop Goes Asia, A Hello from Tokyo (listener contact); 0515 M-F 44 Minutes (feature magazine).

Radio Netherlands

0500 S Aural Tapestry (cultural threads), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F Basement Sessions (classic jazz performances), A A Good Life (global development).

Radio New Zealand International

0500 D RNZ News; 0505 S Whenua! (Maori culture), M-F Checkpoint (comprehensive news), A Tagata o te Moana (Pacific culture).

Voice of Nigeria

0500 S Reflections, M-F Wave Train (music), A African Safari (music); 0505 S Link-Up (music requests); 0530 S/A News, M-F VON Scope (news magazine).

WBCQ, Maine

0500 S Radio Timtron Worldwide.

WHRI, Indiana

5745 kHz.: 0500 A DXing with Cumbre; 0530 A World Harvest Country Style.

7315 kHz.: 0500 M-F Music (Christian contemporary and gospel), A DXing with Cumbre.

7435 kHz.: 0500 A Joe 2 K.

WWCR, Tennessee

3210 kHz.: 0500 M World of Radio; 0505 A Rock the Universe (Christian rock music); 0530 M Communications World.

5070 kHz.: 0500 T Ask WWCR (letters)

0600 UTC - Page 46 Freqs

BBC World Service (eu)

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F World Business Report, A People and Politics; 0645 M Letter from America (Alistair Cooke comments), T/W/F Analysis, H From Our Own Correspondent.

BBC World Service (me)

0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (esof)

0600 S World Briefing, M-A News; 0605 M Talking Point, T-A Outlook; 0620 S Sports Roundup; 0630 S Agenda (trends); 0645 M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC World Service (wcaf)

0600 D World Briefing; 0620 D Sports Roundup; 0630 S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC World Service (eas)

0600 S/A World Briefing, M-F News; 0605 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 0620 S/A Sports Roundup; 0630 S Westway Omnibus, M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A People and Politics.

Channel Africa

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A Channel Africa Sport.

HCJB, Ecuador

0600 S Saludos Amigos, M Mountain Meditations, T-A Family Life Today; 0630 S

Shortwave Guide



Did You Hear? M Renewing Your Mind, T-A Stories of Great Christians; **0645** S/H Specialized English, T Chords of Love (sacred music), W CCR Drama, F Science, Scripture & Salvation, A Wonderful Words of Life (hymns).

Radio Australia

0600 D News; **0605** S The Europeans, A Feedback (letters/station news); **0610** M-F Regional Sports Report; **0620** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0630** A Oz Sounds (new releases); **0640** M Oz Music Show (rock), T/F Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), H Australian Country Style.
[Special service: **0605** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

Radio Habana Cuba

0600 D International News; **0610** M From Habana, T-S National News; **0615** T-S Reports and music; **0630** M The Jazz Place, T-S News Bulletin; **0635** S World of Stamps, T-A Reports and music; **0645** S RHC 40 Years; **0650** S Cuban music.

Radio Japan

0600 D News; **0610** S Weekend Square (Japanese life), A Pop Goes Asia; **0615** M-F Asian Top News (headlines from region's radio); **0625** M Unforgettable Musical Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio New Zealand International

0600 D RNZ News; **0606** S Storytime (children), M-F Worldwatch (international news), A Focus on Politics; **0630** M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report, A In a Mellow Tone (soft sounds); **0655** D Golden Kiwi (prominent NZers).

Voice of Nigeria

0600 S This Week on VON, M Across the Ages, T Agenda for Peace, W Nigerian Newsletter, H West African Scene, F African Writers, A From the Rocks; **0615** S Listeners' Letters, M Nigeria & Politics, T Nigerian Scene, W Wheel of Progress, H World of the Arts, F Images of Nigeria, A Issues of the Moment; **0630** S/A Weekly Analysis, M-F World News; **0640** M-F Commentary & Press Review; **0645** M-F News about Nigeria.

WHRI, Indiana

5745 kHz.: **0630** S DXing with Cumbre.
7315 kHz.: **0604** A Turn Your Radio On; **0630** S World Harvest Country Style.

WWCR, Tennessee

3210 kHz.: **0600** S The Big Backyard (Australian country music), M Spectrum (communications discussion); **0605** T-F Golden Age of Radio Theatre; **0630** S The Old Record Shop (vintage recordings).
5070 kHz.: **0600** M Ken's Country Classics; **0630** S World of Radio.

1000 UTC - Page 48 Freqs

BBC World Service (am)

1000 D World Briefing; **1020** S/A Sports Roundup; **1030** S Agenda (trends), M-F World Business Report, A Science in Action; **1045** M-F Sports Roundup.

BBC World Service (eu)

1000 D World Briefing; **1020** S/A Sports Roundup; **1030** S Agenda (trends), M-F World Business Report, A Science in Action; **1045** M-F Sports Roundup.

BBC World Service (me)

1000 D World Briefing; **1020** S/A Sports Roundup; **1030** S Agenda (trends), M-F World Learning (instructional series), A Science in Action.

BBC World Service (esaf)

1000 S News Summary, M-A World Briefing; **1005** S The Alternative (music); **1020** A Sports Roundup; **1030** S Composer of the Month, M Letter from America, T-F Analysis, A Science in Action; **1045** M-F Sports Roundup.

BBC World Service (wcaf)

1000 S News Briefing, A World Briefing; **1001** S Heart and Soul (religion); **1020** S The Alternative (music), A Sports Roundup; **1030** A Science in Action; **1045** A Radio History of the World.

BBC World Service (eas)

1000 S News Summary, M-F World Briefing, A News; **1001** S Concert Hall; **1005** A Jazzmatazz; **1030** M-F World Business Report, A Greenfield Collection (classical music); **1045** M-F Sports Roundup.

Radio Australia

1000 D News; **1005** S Lingua Franca, M-F Asia Pacific, A Pacific Review; **1030** S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A In Conversation-Science.

R. New Zealand Int.

1000 D News; **1005** M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia); **1011** S Sunday Supplement (NZ opinions); **1025** S Feature program.

Voice of America (News Now)

1000 D World News; **1010** D Regional News; **1014** D USA News; **1018** D Sports; **1022** D Features; **1030** D World News; **1033** S On the Line (US foreign policy), A Best of 'Talk to America'; **1045** M-F Science, Medicine, Environment; **1049** M-F Business and Economic Report; **1053** M-F Music feature.

1100 UTC - Page 48 Freqs

BBC World Service (am) (eu)

1100 D World Briefing; **1120** D British News; **1130** S Arts in Action, M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent; **1145** M-H Sports Roundup, F Football Extra.

[Special service to the Caribbean on 6195 & 15220 kHz.: **1105** M-F Caribbean Report; **1110** M-F Caribbean Sport; **1115** M-F Caribbean Magazine.]

BBC World Service (me)

1100 S World Briefing, M-A News; **1105** M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Wright Around the World (music requests); **1120** S British News; **1130** S Arts in Action, M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music.

BBC World Service (esaf)

1100 S-F World Briefing, A News; **1105** A Westway Omnibus; **1120** S-F British News; **1130** S Arts in Action, M-F World Business Report, A Greenfield Collection (classical music requests); **1145** M-H Sports Roundup, F Football Extra.

BBC World Service (wcaf)

1100 D World Briefing; **1120** D British News; **1130** S Postmark Africa, M-F World Business Report, A Inside Track (African sport); **1145** M-H Sports Roundup, A Football Extra.

BBC World Service (eas)

1100 S/A World Briefing, M-F News; **1105** M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); **1120** S/A British News; **1130** S Play of the Week, M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Science in Action.

HCJB, Ecuador

1100 S Let My People Think, M-F Insight for Living, A We Kids; **1128** M-F Money Minute; **1130** S Encounter, M-F Morning in the Mountains (Christian breakfast show w/Bible Minute 1134, Scriptural Reading 1142, Beyond the Call 1148), A Down Gilead Lane.

Radio Australia

1100 D News; **1105** S Correspondents' Report, M-A Asia Pacific (regional current affairs); **1130** S Bush Telegraph (rural life), M-F Regional Sports Report, A Fine Music Australia (classical); **1135** M-F Life Matters (personal and social issues).

Radio Japan

1100 D News; **1110** S Hello from Tokyo (listener contact), A Pop Goes Asia; **1115** M-F Asian Top News (headlines from region's radio); **1125** M Unforgettable Music Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

Radio Sweden

1130 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report); **A Weekend** (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1145** M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

Radio New Zealand International

1100 D RNZ News; **1105** S Sportsworld, M-H Kim Hill (interviews), F Sports Story, A The World in Sport; **1125** S A Question of Religion; **1130** F Top 5 (music), A NZ News; **1135** A Dateline Pacific.

WHRJ, Indiana

6040 kHz.: **1100** M-F Music (Christian contemporary and gospel).
9495 kHz.: **1100** A Joe 2k; **1130** M-F Music (Christian contemporary and gospel), A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **1100** T World of Radio, W Communications World, F The Big Backyard (Australian country music), A Profiles; **1110** A A View from Europe; **1115** A Eco Watch (ecology); **1130** A World of Radio.

1200 UTC - Page 49 Freqs

BBC World Service (am)(me)(wcaf)

1200 D News-hour.

[Special service to the Caribbean on 6195 & 15220 kHz.: **1205** M-F Caribbean Business; **1210** M-F Caribbean Report.]

BBC World Service (eu)

1200 D News; **1205** S The Alternative (music), M-F Outlook (magazine), A Wright Around the World (music requests); **1230** S Global Business; **1245** M A Radio History of the World, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC World Service (esaf)

1200 S/A News-hour, M-F News; **1205** M-F Outlook (magazine); **1245** M A Radio History of the World, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC World Service (eas)

1200 S Play of the Week (cont'd. from 1130), M-A News; **1205** M-F Outlook (magazine), A Panel game or Quiz; **1230** S Agenda (trends), A Assignment; **1245** M Patterns of Faith, T A Radio History of the World, W Heart and Soul, H Best of 'The Edge', F Body and Mind.

HCJB, Ecuador

1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from 1130 w/ Latin American & International News 1200 & 1230, Sports News 1205, Insights 1206, Mission Network News 1224, Church Doctor 1233, Guidelines for Living 1245, The Gospel Truth 1255), A Adventures in Odyssey; **1230** S Words to Live By, A Toonz!.

Radio Australia

1200 D News; **1205** S Country Club (country music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

Radio Canada International

1200 M-F News; **1210** M-F This Morning (magazine).

Radio Sweden

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report); **A Weekend** (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1245** M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRJ, Indiana

6040 kHz.: **1200** A DXing with Cumbre; **1205** M-F Music (Christian contemporary and gospel).
15105 kHz.: **1205** M-F Music (Christian contemporary and gospel), **1230** S Joe 2k, A DXing with Cumbre.

WWCR, Tennessee

5070 kHz.: **1205** A Rock the Universe (Christian rock music).
15685 kHz.: **1245** M Eco Watch (ecology).

YLE Radio Finland

1230 S Capital Cafe (conversations), M-F Finland This Morning (magazine), A Finland This Week (review); **1245** A Starting Finnish (language course).

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1300 UTC - Page 49 Freqs

BBC World Service (am)

1300 D News; 1305 S Jazzmatazz, M-F Outlook (magazine), A Global Business; 1330 S In Praise of God, A People & Politics; 1345 M-F Off the Shelf (book readings).

BBC World Service (eu)

1300 S/A Newshour, M-F News; 1305 M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music.

BBC World Service (me)

1300 D News; 1305 S The Alternative (music), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Jazzmatazz; 1330 S Global Business, M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (best of the BBC), F People and Places.

BBC World Service (wcaf)

1300 D News; 1305 S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatazz; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A Arts in Action.

BBC World Service (esaf)

1300 D News; 1305 S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatazz; 1330 M Composer of the Month, T Music Mix, W UK Top 20, H Panel game or Quiz, F World of Music, A People and Politics.

BBC World Service (eas)

1300 D Newshour; 1350 M-F World Business Report.

Channel Africa

1300 S/A Channel Africa Extra (weekend variety magazine).

China Radio International

1300 D News; 1310 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1320 S In the Spotlight (cultural magazine), A Listeners' Garden; 1330 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCB, Ecuador

1300 S Message of Truth, M-F Precept, A Toonz! (from 1230); 1313 M-F Getting the Message; 1315 M-F Proclaim; 1330 S Mountain Meditations, M-F Family Life Today, A Rock Solid.

Radio Australia

1300 D News; 1305 S Country Club (cont'd. from 1205), A The Science Show; 1310 M-F Regional Sports Report; 1315 M-F The Planet (diverse music from around the world).

Radio Canada International

1300 D News; 1305 S The Sunday Edition, M-F This Morning (cont'd. from 1210), A The House (Canadian politics).

Radio Sweden

1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); 1345 M Sports Scan, T Media Scan (1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: 1307 S Music (Christian contemporary and gospel); 15105 kHz.: 1300 M-F World Harvest Live; 1315 S Music (Christian contemporary and gospel); 1345 A Music (Christian contemporary and gospel).

WWCR, Tennessee

15685 kHz.: 1315 A Ask WWCR (letters).

1400 UTC - Page 50 Freqs

BBC World Service (am)

1400 D News; 1405 S Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1430 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1445 W UK Album Chart, F Music X-Press.

BBC World Service (eu)(wcaf)

1400 D News; 1405 S Talking Point (global phone-in), M Discovery (science), T Health Matters, W Science View, H Sports International, F One Planet (ecology), A Sportsworld (live action); 1430 M Essential Guide, T Everywoman, W Focus on Faith, H Pick of the World (best of the BBC), F People and Places.

BBC World Service (me)(esaf)

1400 S/A News, M-F World Briefing; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1420 M-F World Business Report; 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

BBC World Service (eas)

1400 S/A News, M-F East Asia Today; 1405 S Talking Point (global phone-in), A Sportsworld (live action); 1430 M-F British News; 1445 M-H Sports Roundup, F Football Extra.

Channel Africa

1300 S/A Channel Africa Extra (cont'd from 1200).

China Radio International

1400 D News; 1410 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1420 S In the Spotlight (cultural magazine), A Listeners' Garden; 1430 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

HCJB, Ecuador

1400 S Renewing Your Mind, M-F Haven, A Rock Solid (from 1330).

Radio Australia

1400 D News; 1405 S Books and Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

Radio Canada International

1400 D News; 1405 S The Sunday Edition (cont'd. from 1310), M-F This Morning (cont'd. from 1210), A Vinyl Cafe; 1430 F C'est La Vie (life in French Canada); 1445 M-H Out Front (experimental radio).

Radio Japan

1400 D News; 1410 S Pop Goes Asia, A Weekend Square (Japanese life); 1415 M-F 44 Minutes (feature magazine).

WHRI, Indiana

6040 kHz.: 1400 M-F World Harvest Live; 1430 S/A DXing with Cumbre; 15105 kHz.: 1405 M-F Music (Christian contemporary and gospel); 1430 S Music (Christian contemporary and gospel),

1500 UTC - Page 51 Freqs

BBC World Service (am)(eu)(eas)

1600 S/A News, M-F Europe Today; 1605 S/A Sportsworld (live action); 1630 M-F World Business Report; 1645 M-F Sports Roundup.

BBC World Service (me)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1645 W UK Album Chart, F Music X-Press.

BBC World Service (wcaf)(esaf)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); 1630 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1645 W UK Album Chart, F Music X-Press.

China Radio International

1500 D News; 1510 S Report on Developing Countries, M-F Current Affairs, A Global Review; 1520 S In the Spotlight (cultural magazine), A Listeners' Garden; 1530 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

1530 D Report from Austria (magazine); 1535 S Radio E, A Week in Review; 1550 A Listener Letters.

Radio Canada International

1500 S/A News; 1505 S The Sunday Edition (cont'd. from 1310), A Quirks and Quarks (science).

WHRI, Indiana

13760 kHz.: 1505 S World Harvest Country Style; M-F Music (Christian contemporary and gospel); 1530 S/A DXing with Cumbre; 15105 kHz.: 1500 S DXing with Cumbre; 1502 A 20 The Countdown Magazine (Christian rock music charts); 1505 M-F Music (Christian contemporary and gospel).
17650 kHz.: 1505 M-F Music (Christian contemporary and gospel); 1515 S Music (Christian contemporary and gospel).

1600 UTC - Page 51 Freqs

BBC World Service (am)(eu)(eas)

1600 S/A News, M-F Europe Today; 1605 S/A Sportsworld (live action); 1630 M-F World Business Report; 1645 M-F Sports Roundup.

BBC World Service (me)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; 1645 W UK Album Chart, F Music X-Press.

BBC World Service (wcaf)(esaf)

1600 D News; 1605 S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); 1630 M/F Fast Track (African sport), T The Story of Africa, W Talkabout Africa, H Artbeat.

HCJB, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

Radio Australia

1600 D News; 1605 S The National Interest (Australian politics), M Margaret Throsby (interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAYE! (Aboriginal culture), A Melisma (cont'd. from 1505); 1630 W Earshot (Australian voices).

WHRI, Indiana

13760 kHz.: 1615 S Music (Christian contemporary and gospel).
15105 kHz.: 1600 A 20 The Countdown Magazine (Christian rock music charts); 1605 S-F Music (Christian contemporary and gospel).
17650 kHz.: 1600 A Music (Christian contemporary and gospel).

WWCR, Tennessee

12060 kHz.: 1630 A Keen on Jazz.
15685 kHz.: 1600 M-F World Wide Country Radio (country music).

Shortwave Guide



1700 UTC - Page 52 Freqs

BBC World Service (eu)

1700 D News; **1701** S Play of the Week (radio theatre); **1705** M-F Outlook (magazine), A From Our Own Correspondent; **1730** A Agenda (trends); **1745** M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

BBC World Service (me)

1700 S-F News, A World Briefing; **1701** S Play of the Week (radio theatre); **1705** M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); **1720** A British News; **1730** M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (wcaf)(esaf)

1700 D News; **1705** D Focus on Africa; **1745** D Sports Roundup.

BBC World Service (sas)

1700 S/A World Briefing, M-F News; **1705** M Panel game or Quiz, T The Alternative (music), W Greenfield Collection (classical music requests), H Jazzmatazz, F Composer of the Week; **1720** S/A British News; **1730** S Reporting Religion, M-F Off the Shelf (book readings), A World Business Review; **1745** D Sports Roundup.

1800 UTC - Page 52 Freqs

BBC World Service (eu)

1800 S/A World Briefing, M-F News; **1805** T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); **1820** S/A British News; **1830** S Assignment, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A World Business Review; **1845** W UK Album Chart, F Music X-Press, A Letter from America.

BBC World Service (me)(wcaf)

1800 D World Briefing; **1820** D British News; **1830** S Assignment, M-F World Business Report, A World Business Review; **1845** M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

BBC World Service (esaf)

1800 S/A World Briefing, M-F News; **1805** M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); **1820** S/A British News; **1830** S Assignment, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A World Business Review; **1845** A Letter from America.

1900 UTC - Page 53 Freqs

BBC World Service (eu)

1900 S/A World Briefing, M-F News; **1905** M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science); **1920** S/A Sports Roundup; **1930** S Science in Action, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC World Service (me)

1900 S/A News, M-F World Briefing; **1905** S Greenfield Collection (classical music requests), A Jazzmatazz; **1920** M-F Sports Roundup; **1930** S From Our Own Correspondent, M Body and Mind (health), T Patterns of Faith, W A Radio History of the World, H Heart and Soul (religion), F Best of 'The Edge' (youth culture), A Composer of the Month.

BBC World Service (wcaf)

1900 D News; **1905** S From Our Own Correspondent, M-F Focus on Africa, A Westway Omnibus (drama serial); **1930** S Body and Mind (health), M/F Fast Track (African sport), T Artbeat, W Talkabout Africa, H Postmark Africa, A Greenfield Collection (classical music requests)

BBC World Service (esaf)

1900 S-F News, A World Briefing; **1905** S Wright Around the World (music requests), M-F Focus on Africa; **1920** A Sports Roundup; **1930** M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Science in Action.

2000 UTC - Page 53 Freqs

BBC World Service (eu)(me)

2000 D Newshour.

BBC World Service (wcaf)(esaf)

2000 D Newshour; **2050** D Sports Roundup.

2100 UTC - Page 54 Freqs

BBC World Service (am)

2100 D News; **2105** S Global Business, M-F World Business Report, A World Business Review; **2120** M-A British News; **2130** D Sports Roundup; **2145** S Reporting Religion, M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

[Special service to the Caribbean on 5975/11675/15390 kHz.: 2105 M-F Caribbean Report. Special service to the Falklands on 5975/11680 kHz.: 2130 T/F Calling the Falklands.]

BBC World Service (eu)

2100 D News; **2105** M-F World Business Report, A Jazzmatazz; **2120** M-F British News; **2130** S Panel game or Quiz, M-F Sports Roundup, A Composer of the Month; **2145** M-F Off the Shelf (book readings).

BBC World Service (wcaf)

2100 D News; **2105** S Wright Around the World (music requests), M Health Matters, T Science View, W Sports International, H One Planet (ecology), F Discovery (science), A Science in Action; **2130** M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A People and Politics.

Radio Australia

2100 D News; **2105** F Feedback A Australia All Over; **2110** S-H AM (morning news magazine); **2130** S Educational series, M Health Report, T Innovations, W Religion Report, H Rural Reporter, F Jazz Notes.

2200 UTC - Page 55 Freqs

BBC World Service (am)

2200 D The World Today; **2230** S Agenda (trends), F People and Politics, A From Our Own Correspondent.

BBC World Service (wcaf)

2200 D News; **2205** S Panel game or Quiz, M-F Outlook (magazine), A Omnibus (documentary); **2230** S World of Music, A From Our Own Correspondent; **2245** M Patterns of Faith, T A Radio History of the World, W Heart and Soul (religion), H Best of 'The Edge' (youth culture), F Body and Mind (health).

Radio Australia

2200 D News; **2210** S-H AM (morning news magazine), F Asia Pacific Weekend Edition, A Correspondents' Report; **2240** S Australian Music Show (rock), M/W Music Deli (international), T Blocktracker (Aboriginal contemporary), W Country Style.

Radio Canada International

2200 S/A The World This Weekend, M-F The World at 6; **2230** S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

Radio Vlaanderen International

2230 S Radio World, M-F News, A Music from Flanders; **2234** M-F Belgium Today; **2238** S Tourism in Flanders, M-F Press Review; **2243** M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; **2244** S Brussels 1043 (letters); **2248** M Sports, W Around Town, H International Report, F Tourism in Flanders; **2254** S-F Soundbox (Flemish rock).

2300 UTC - Page 55 Freqs

BBC World Service (am)

2300 S World Briefing, M-F News, A News Summary; **2301** A Play of the Week (radio theatre); **2305** M-F Outlook (magazine); **2320** S Sports Roundup; **2330** S Greenfield Collection (classical music); **2345** M Patterns of Faith, T Plain English, W Heart & Soul (religion), H Best of 'The Edge' (youth culture), F Body & Mind (health).

BBC World Service (eos)

2300 D The World Today; **2330** F Global Business, A Arts in Action.

China Radio International

2300 D News; **2310** S Report on Developing Countries, M-F Current Affairs, A Global Review; **2320** S In the Spotlight (cultural magazine), A Listeners' Garden; **2330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China.

Radio Australia

2300 D News; **2305** F Lingua Franca (about language, A Ockham's Razor (science issue)); **2310** S-H Asia Pacific (regional current affairs); **2320** F Short Story; **2330** S Earthbeat (ecology), M Innovations (Australian products/ingenuity), T Arts Talk, W Rural Reporter, H Media Report, F In Conversation-Science.

Radio Canada International

2300 D CBC News; **2305** S Global Village (world music), M-F As It Happens (interviews with newsmakers)[began at 2230], A Quirks & Quarks (science); **2330** W Dispatches (world events through Canadian eyes).

Radio Netherlands

2330 S/A News; M-F Newsline; **2335** S Sincerely Yours (letters), A Europe Unzipped; **2355** A Insight (commentary).

Radio New Zealand International

2300 S-H World and Pacific News, F/A RNZ News; **2310** S-H Sports News, F Saturday Night with John Campbell, A Feature or series; **2315** S-H Pacific Weather; **2317** Kim Hill (interviews/current affairs).

WBCQ, Maine

7415 kHz.: **2300** S Le Show (humor/entertainment), F Scream of the Butterfly, A The Real Amateur Radio Show; **2330** W World of Radio, A Fred Flintstone Music Show. 17495 kHz.: **2300** A Marion's Attic (vintage recordings).

WHRI, Indiana

5745 kHz.: **2300** F DXing with Cumbre; **2330** A DXing with Cumbre. 7315 kHz.: **2300** F DXing with Cumbre; **2330** A DXing with Cumbre; **2335** F Music (Christian contemporary and gospel). 7580 kHz.: **2300** F 20 The Countdown Magazine (Christian contemporary music charts).

WWCR, Tennessee

3215 kHz.: **2330** S Ken's Country Classics 5070 kHz.: **2305** S Pat Boone Show.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Bob Fraser, Cohasset, MA; Hans Johnson, WY/Ulis Fleming, MD /Cumbre DX/ BBCM; BBC Harold Sellers, DX Ontario; Hard Core DX; Radio Sweden/Media Scan; Robert E. Thomas, Bridgeport, CT; Usenet Newsgroups; Worldwide DX Club.

Satellite Service Guide



Robert Smathers

roberts@nmia.com

www.grove-ent.com/mtssg.html

All Frequencies MHz

GE Americom GE-1 - C-Band

103 degrees West longitude

1(H)	3720	Occasional video/HUD-TV (Housing and Urban Development)
2(V)	3740	Occasional video
3(H)	3760	PBS (digital)
4(V)	3780	Fox Sports Net (digital)
5(H)	3800	GEMS/Globecast (digital)
6(V)	3820	Valuevision (digital)
7(H)	3840	PaxTV/Worship TV/Praise TV (digital)
8(V)	3860	In Demand PPV (digital)
9(H)	3880	Fox Sports South (VC2+) 7.28 KHC-BFM, Houston, TX - religious format
10(V)	3900	Data Transmissions
11(H)	3920	Univision feeds (digital)
12(V)	3940	Wisdom Television 7.10, 7.92 Wisdom Radio
13(H)	3960	In Demand PPV (digital)
14(V)	3980	In Demand PPV (digital)
15(H)	4000	Total Living Network (digital)
16(V)	4020	Occasional video
17(H)	4040	Telemundo (digital)
18(V)	4060	Fox Sports Net (digital)
19(H)	4080	Data Transmissions
20(V)	4100	M2: Music Television
21(H)	4120	Univision feeds (occasional)
22(V)	4140	Deutsche Welle TV 7.38, 7.56 Deutsche Welle radio (German) 7.74 Deutsche Welle radio (English) 7.92 Deutsche Welle radio (various languages)
23(H)	4160	TV Games Network (VC2+)
24(V)	4180	Data Transmissions

GE Americom GSTAR-4 - Ku-Band

105 degrees West longitude

T01(H)	11730	Data Transmissions
T02(H)	11791	Data Transmissions
T03(H)	11852	Occasional video
T04(H)	11913	Occasional video
T05(H)	11974	Court TV feeds (occasional)/Occasional video
T06(H)	12035	Data Transmissions
T07(H)	12096	Data Transmissions
T08(H)	12157	Data Transmissions
T09(V)	11744	Data Transmissions
T10(V)	11805	Data Transmissions
T11(V)	11866	Data Transmissions
T12(V)	11927	Data Transmissions
T13(V)	11988	Occasional video
T14(V)	12049	Data Transmissions
T15(V)	12110	Occasional video
T16(V)	12171	Data Transmissions

Telesat Canada Anik F1 - C-band

107.3 degrees West longitude

Transponders with an "S" are beamed to South America.

1A(H)	3720	(none)
S1A(H)	3720	Data Transmissions
1B(V)	3740	Data Transmissions
2A(H)	3760	CBC (digital)
S2A(H)	3760	(none)
2B(V)	3780	Musimax/Musique Plus (digital)
3A(H)	3800	Data Transmissions
S3A(H)	3800	Data Transmissions
3B(V)	3820	Occasional video
4A(H)	3840	(none)
S4A(H)	3840	Data Transmissions
4B(V)	3860	Occasional video
5A(H)	3880	(none)
S5A(H)	3880	Data Transmissions
5B(V)	3900	Cancom (digital)
6A(H)	3920	Radio Canada (digital)
S6A(H)	3920	(none)
6B(V)	3940	Cancom (digital)
7A(H)	3960	CBC feeds (occ video)/SCPC Services 1205.50 (54.5) CBC Radio
		1206.00 (54.0) CBC Radio - Occasional feeds/events
S7A(H)	3960	(none)
7B(V)	3980	Cancom (digital)
8A(H)	4000	Occasional video
S8A(H)	4000	(none)
8B(V)	4020	Occasional video
9A(H)	4040	CBC feeds (occ video)/SCPC Services 1126.00 (54.0) CBC Radio
		1125.50 (54.5) CBC Radio
S9A(H)	4040	(none)
9B(V)	4060	Meteo Media/TV 5 (digital)
10A(H)	4080	(none)
S10A(H)	4080	Data Transmissions
10B(V)	4100	CTV/The Weather Network (digital)
11A(H)	4120	Occasional video
S11A(H)	4120	(none)
11B(V)	4140	Occasional video

Telesat Canada Anik F1 - Ku-Band

107.3 degrees West longitude

Transponders with an "S" are beamed to South America.

T1(V)	11714	Star Choice (digital)
T2(V)	11744	Star Choice (digital)
T3(V)	11775	Star Choice (digital)
T4(V)	11807	Star Choice (digital)
T5(V)	11836	Star Choice (digital)
T6(V)	11867	Star Choice (digital)
T7(V)	11897	Star Choice (digital)
T8(V)	11928	Star Choice (digital)
T9(V)	11960	Star Choice (digital)
T10(V)	11990	Star Choice (digital)
T11(V)	12020	Star Choice (digital)
T12(V)	12051	Star Choice (digital)
T13(V)	12081	Star Choice (digital)
T14(V)	12113	Star Choice (digital)
T15(V)	12140	Star Choice (digital)
T16(V)	12172	Star Choice (digital)
T17(H)	11725	Star Choice (digital)
T17S(H)	11725	(none)
T18(H)	11756	Star Choice (digital)
T18S(H)	11756	(none)
T19(H)	11786	Star Choice (digital)
T19S(H)	11786	(none)
T20(H)	11817	Star Choice (digital)
T20S(H)	11817	(none)
T21(H)	11850	Star Choice (digital)
T21S(H)	11850	Data Transmissions
T22(H)	11880	Star Choice (digital)
T22S(H)	11880	(none)
T23(H)	11910	SRC/CBC feeds
T23S(H)	11910	(none)
T24(H)	11940	CBC/SRC feeds
T24S(H)	11940	(none)
T25(H)	11971	Star Choice (digital)
T25S(H)	11971	(none)
T26(H)	12002	Star Choice (digital)
T26S(H)	12002	(none)
T27(H)	12033	Star Choice (digital)
T27S(H)	12033	(none)
T28(H)	12063	Star Choice (digital)
T28S(H)	12063	(none)
T29(H)	12094	Star Choice (digital)
T29S(H)	12094	(none)
T30(H)	12124	Star Choice (digital)
T30S(H)	12124	(none)
T31(H)	12155	Star Choice (digital)
T31S(H)	12155	Data Transmissions
T32(H)	12180	Star Choice (digital)
T32S(H)	12180	Data Transmissions

Telesat Canada Anik E2 - Ku-Band

111 degrees West longitude

T01(V)	11717	Data Transmissions
T02(V)	11743	Data Transmissions
T03(V)	11778	Data Transmissions
T04(V)	11804	Data Transmissions
T05(V)	11839	Data Transmissions
T06(V)	11865	Data Transmissions
T07(V)	11900	Occasional video
T08(V)	11926	Occasional video
T09(V)	11961	Saskatchewan Communications Network (SCN) (digital)
T10(V)	11987	Star Choice (digital)
T11(V)	12022	Star Choice (digital)
T12(V)	12048	Star Choice (digital)
T13(V)	12083	Star Choice (digital)
T14(V)	12109	Star Choice (digital)
T15(V)	12144	Telesat G.L.A.C.S. (digital)
T16(V)	12170	Occasional video
T17(H)	11730	Data Transmissions
T18(H)	11756	Data Transmissions
T19(H)	11791	Data Transmissions
T20(H)	11817	Data Transmissions
T21(H)	11852	Star Choice (digital)
T22(H)	11878	Star Choice (digital)
T23(H)	11913	Occasional video
T24(H)	11939	Occasional video
T25(H)	11974	Star Choice (digital)
T26(H)	12000	Star Choice (digital)
T27(H)	12035	Occasional video
T28(H)	12061	Occasional video
T29(H)	12096	Occasional video
T30(H)	12122	Telesat G.L.A.C.S. (digital)
T31(H)	12157	Star Choice (digital)
T32(H)	12183	Star Choice (digital)

TeleSat Canada Anik E2 - C-Band

111 degrees West longitude

1A(H)	3720	Occasional video
1B(V)	3740	Occasional video
2A(H)	3760	Data Transmissions
2B(V)	3780	Data Transmissions
3A(H)	3800	Data Transmissions

See Universal Electronic's ad on page 79 for satellite equipment.



Operational WXSATs

Just a few weeks after the new daily resynchronization routine was implemented for NOAA-15, problems appear to have taken over once more. The AVHRR (advanced very high resolution radiometer) is synchronized each day at 0730UTC. Despite this, many passes during May were once more providing unsynchronized data. Images are characterized by missing lines. Fortunately, some passes remain good, and due to the favorable ground illumination of the morning passes, these can be spectacular. If the image is already good during resynchronization, just a few seconds of data are lost.

NOAA is not the only organization experiencing problems with its fleet. Meteor 2-21 was reactivated in late April, transmitting APT (automatic picture telemetry) on 137.40 MHz, to act as a temporary replacement for Meteor 3-5. This has been an established routine each time that Meteor 3-5's orbit precesses into full sunlight (where, paradoxically, although continuously illuminated, the actual strength of the sunlight is minimal due to its aspect). I logged Meteor 2-21's transmission on 26 April, yet within a day or so it appeared to have been powered off. The same day, a transmission from Okean-O was received on 137.40 MHz, which might explain the apparent switch-off of Meteor 2-21.

With NOAA-16 not providing any APT either, we have another period of limited satellite transmissions. At least GOES is reliable!

Correspondence

A number of readers have sent images showing significant weather in their regions. This month I am including two such images from Joseph Gresham. Joseph's first image was received from GOES while using the CONUS (continental US) rapid scan mode. As of April 22, he commented "For the last three days, the nation's heartland has been getting pounded, with Kansas having tornadoes and severe storms. Figure 1 shows the CONUS Rapid Scan, and as you can see another cold front is going through Texas and Kansas with severe storms – notice the warm front just ahead."

I believe Joseph has recently acquired a new HRPT system from Timestep, or their US agents. He completed the set-up and plans to mount the tracking dish on a tower. He sent me figure 2 – an image from NOAA-16. "As you can see, there is a low pressure system giving Cuba some major thunderstorms. On the down side, central Florida did not get any rain from this, and we are in a severe drought." Internet site update.

Their site notes that there are a couple of small differences between this latest GOES and the previous GOES birds (GOES-8 through GOES-11):

The 12.0 micrometer infrared channel (useful for such things as volcanic ash detection and low-level moisture detection) is being replaced with a 13.35micrometer "CO₂ absorption channel" (to be used to improved cloud cover and cloud height measurements).

The water vapor channel is double the resolution of previous GOES – 4km (instead of 8km) – and is a little wider.

<http://cimss.ssec.wisc.edu/>

<http://cimss.ssec.wisc.edu/goes realtime/grtmain.html#gscb05>

Some personal thoughts

I have to admit a degree of envy at the enlightened attitude to satellite image transmissions shown by the USA, in comparison to that shown by Eumetsat – the European organization responsible for the operation of Meteosat-7. I really need the high resolution (Primary Data) images transmitted almost continuously from Meteosat-7. Following a controversial decision by Eumetsat's council, virtually all Meteosat's images are encrypted, preventing the majority of users from seeing what the satellite is providing.

Moving house! When we first moved here, nearly 18 years ago, the house was selected for its accommodation. With our son and daughter having moved towards London, I now need a bigger garden for my dishes and antenna, and to get better coverage for my weather satellite tracking system! The tracking dish receives NOAA high resolution picture telemetry (HRPT) from a limited sky; there is virtually no east because our house is three stories tall. I am searching for a house and garden that will allow me to "rediscover" Europe.

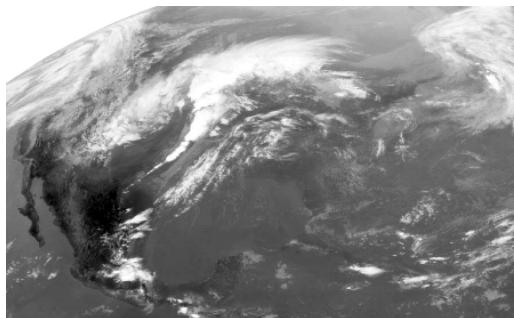


Fig 1: CONUS rapid scan image April 22, 22:41UTC channel-4 (infrared) from Joseph Gresham.

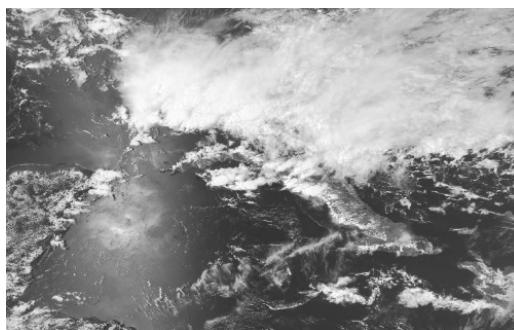


Fig 2: NOAA-16 HRPT image from April 29, from Joseph Gresham.

The Cooperative Institute for Meteorological Satellite Studies (CIMSS) is based at the Space Science and Engineering Center, at the university of Wisconsin-Madison. I discovered their home page while checking out information about the next GOES WXSAT – GOES-M. The Institute provides free access to a variety of satellite-originated imagery and data, together with real-time images and updates on GOES.

Frequencies

NOAA-14 transmits APT on 137.62 MHz
NOAA-12 and NOAA-15 transmit APT on 137.50 MHz
Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight
Meteor 2-21 may transmit APT on 137.40 MHz (when 3-5 is off)
Resurs 1-4 transmits APT on 137.85 MHz
GOES-8 and GOES-10 transmit WEFAX on 1691 MHz

THE FED FILES

A GUIDE TO GOVERNMENT COMMUNICATIONS

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The Coast Guard on VHF/UHF - I

In last month's *Fed Files* column we presented a sampling of HF spectrum radio frequencies for the U.S. Coast Guard. This month we continue our service profile with a look at some of the Coast Guard's VHF/UHF nationwide assignments and VHF Marine Information Broadcast frequency and transmission times.

General VHF/UHF Assignments

Here is a sample of the Coast Guard's nationwide authorizations. These frequencies should be loaded in your scanner if you are a maritime enthusiast.

40.500	Military joint common frequency (NFM-Narrowband FM)
46.900	Meteor Burst communications net (FM)
49.830	Meteor Burst communications net (FM)
121.500	Non-Scheduled Marine Broadcast (AM)
122.900	National VHF-AM Search and Rescue (SAR) training frequency (AM)
122.950	Coast Guard Auxiliary Aircraft (AM)
123.100	International VHF-AM SAR frequency (AM)
126.200	Coast Guard Aircraft-Ships Air/Surface (AM)
156.300	Non-Scheduled Marine Broadcast/On-scene SAR frequency/Intership Simplex/Shore Stations to non-government vessels (Channel 6) (NFM)
156.375	Intership Simplex (Channel 67) (NFM)
156.525	International Digital Selective Calling (DSC) for Distress, Safety and Calling (NFM)
156.600	Non-Scheduled Marine Broadcast (Channel 12) (NFM)
156.650	Intership Simplex (Channel 13) (NFM)
156.750	SAR Datum Marker Beacons (NFM)
156.800	International Distress, Safety and Calling (Channel 16) (NFM)
157.075	Marine Environmental Operations (Channel 81) (NFM)
157.100	Non-Scheduled/Scheduled Marine Information Broadcast (Channel 22) (NFM)
169.450/	
171.025	National Law Enforcement Liaison Net
229.325	SAR Datum Marker Beacons (AM)
229.335	SAR Datum Marker Beacons (AM)
237.900	Air-to-Air homing (AM)
240.600	SAR Datum Marker Beacons (AM)
242.650	SAR Datum Marker Beacons (AM)
242.6625	SAR Datum Marker Beacons (AM)
243.000	Non-Scheduled Marine Broadcast (AM)
275.100	SAR Datum Marker Beacons (AM)
277.800	Navy Fleet Warning/Tactical frequency (AM)
282.800	Joint/Combined on-scene SAR and UHF DF frequency (AM)
381.700	UHF Air/Surface (AM)
381.800	UHF Air/Surface (AM)
383.900	UHF Air/Surface (AM)
406.025	COSPAS-SARSAT satellite ERIPB frequency (NFM)
408.400	National Strike Force Fixed Link Net
418.050	National Strike Force Fixed Link Net

418.075	National Strike Force Fixed Link Net
418.575	National Strike Force Fixed Link Net
467.750	Coast Guard on-board communications

NMD 32	Muskegon	1635/1935/2235 0235/0535/0835/1135/1435/ 1735/2035/2335
NMD 35	Alexandria Bay	0235/0535/0835/1135/1435/ 1735/2035/2335
NMD 47	Buffalo	0255/0555/0855/1155/1455/ 1755/2055/2355

VHF Marine Information Broadcast Schedule

(Marine Channel 22A) All times are UTC, mode is narrowband FM.

1st Coast Guard District

Callsign	Location	Broadcast Times
NMF 2	Woods Hole	1005/2205
NMF 7	Boston	1035/2235
NMF 31	Portland	1105/2305
NMF 44	Southwest Harbor	1135/2335
NMY 3	New York	1050/2250
NMY15	Long Island Sound	1120/2320
NMY 42	Moriches	0010/1210
NMY 52	Sandy Hook	1020/2220

NOG	Sault Ste. Marie	0005/0305/0605/0905/1205/ 1505/1805/2105
NOG 14	Duluth	0135/0435/0735/1035/1335/ 1635/1935/2235

2nd Coast Guard District

Callsign	Location	Broadcast Times
NML 7	Memphis, TN	0100/0700/1400/1900
NML 20	Louisville, KY	0300/0900/1600/2100
NML 21	Keokuk, IA	0200/0800/1300/2000

11th Coast Guard District

Callsign	Location	Broadcast Times
NMC 6	Monterey	1615/2345
NMC 11	Humboldt Bay	1615/2315
NMC 17	Group San Francisco	1630/1900/2330
NMQ 9	Group Los Angeles – Long Island	0200/1800
NOR	San Diego	0100/1700

5th Coast Guard District

Callsign	Location	Broadcast Times
NMK	Cape May	1103/2303
NMN 13	Cape Hatteras	0100/1055
NMN 37	Fort Macon	0130/1030
NMN 70	Chincoteague	0200/1145
NMN 80	Hampton Roads	0230/1120
NMX	Baltimore	0130/1205

13th Coast Guard District

Callsign	Location	Broadcast Times
NMW	Astoria	0533/1733
NMW 43	Seattle	0630/1830
NMW 44	Portland	1745
NOE	North Bend	0603/1803
NOW	Port Angeles	0615/1815

14th Coast Guard District

Callsign	Location	Broadcast Times
NMO 2	Honolulu	0500/1700
NRV	Guam	0900/2100

17th Coast Guard District

Callsign	Location	Broadcast Times
NMJ 1	Juneau	0203/0303/0403/1403/1433/ 1503
NMJ 2	Ketchikan	0215/0233/0315/1415/1433/ 1515
NMJ 3	Valdez	0115/0715/1315/2115
NOJ	Kodiak	0130/0230/0530/1430/1600/ 1800
NOV	Sitka	0103/0903/1350/2103

Next month we will complete our profile of the Coast Guard. We will include a variety of District VHF/UHF scanner frequencies.

And that is it for this month's edition of *The Fed Files*. Now it is time to look at this month's federal spectrum scan in Table One. In this issue we continue our detailed look at the reorganized 406-420 MHz UHF federal land mobile service. 73 and good hunting.

Table One: Federal UHF Land Mobile Service

Frequency	Ch/Paired Freq	Agencies					
415.0000	712/Simplex	Army, IRS (Nationwide)					
415.0125	713/Simplex	(No reported activity)					
415.0250	714/Simplex	Bureau of Indian Affairs, Bureau of Land Management, Fish and Wildlife Service, Geological Survey, Interior Department (Nationwide), Post Office, TVA	415.3125	17/406.3125	Forest Service	415.5625	37/406.5625
			415.3250	18/406.3250	Agriculture Department (Nationwide), Agriculture Research Service, Animal and Plant Health Inspection Service, Federal Reserve System, Food Safety and Inspection Service, Forest Service, Soil Conservation Service	415.5750	38/406.5750
415.0375	715/Simplex	(No reported activity)					
415.0500	716/Simplex	Post Office (Nationwide)					
415.0625	717/Simplex	(No reported activity)					
415.0750	718/Simplex	Bureau of Land Management, Bureau of Reclamation, Energy Department, Federal Reserve System, Geological Survey, Interior Department (Nationwide), TVA	415.3375	19/406.3375	(No reported activity)	415.5875	39/406.5875
			415.3500	20/406.3500	Federal Trunk Group 3 (paired with 406.5500): Agriculture Department (Nationwide), Air Force, Army, Bureau of Prisons, Energy Department, Federal Grain Inspection Service, Forest Service, NASA	415.6000	40/406.6000
415.0875	719/Simplex	(No reported activity)					
415.1000	720/Simplex	Customs Service, Federal Reserve System, IRS (Nationwide)	415.3625	21/406.3625	(No reported activity)	415.6125	41/406.6125
415.1125	1/406.1125	(No reported activity)					
415.1250	2/406.1250	Hydrologic Channel (center frequency): US Government/Non-Government Agencies (paired with 406.1250)	415.3750	22/406.3750	Agriculture Department (Nationwide), Food Safety and Inspection Service, Forest Service, NASA	415.6250	42/406.6250
415.1375	3/406.1375	(No reported activity)					
415.1500	4/406.1500	Federal Trunk Group 1 (paired with 406.3500): Air Force, Army, Bureau of Land Management, Bureau of Mines, Bureau of Prisons, Energy Department, Interior Department (Nationwide), NASA, Navy, Post Office	415.3875	23/406.3875	(No reported activity)	415.6375	43/406.6375
			415.4000	24/406.4000	Agriculture Department (Nationwide), Bureau of Land Management (Nationwide), Forest Service (Nationwide), National Institute of Health, Navy, Post Office, Veterans Administration	415.6500	44/406.6500
415.1625	5/406.1625	(No reported activity)					
415.1750	6/406.1750	Hydrologic Channel (center frequency): US Government/Non-Government Agencies (paired with 406.1750): Army, Bureau of Reclamation, General Services Administration, National Park Service, Navy	415.4125	25/406.4125	(No reported activity)	415.6625	45/406.6625
			415.4250	26/406.4250	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Army, Bureau of Land Management, Forest Service, IRS	415.6750	46/406.6750
415.1875	7/406.1875	(No reported activity)					
415.2000	8/406.2000	General Services Administration (Nationwide repeater output/simplex)	415.4375	27/406.4375	(No reported activity)	415.6875	47/406.6875
415.2125	9/406.2125	(No reported activity)					
415.2250	10/406.2250	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Forest Service, Post Office, Soil Conservation Service	415.4500	28/406.4500	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Army, Bureau of Land Management, FAA, Forest Service, Government Printing Office, HHS, NASA, Post Office, TVA	415.7000	48/406.7000
			415.4625	29/406.4625	(No reported activity)	415.7125	49/406.7125
415.2375	11/406.2375	(No reported activity)					
415.2500	12/406.2500	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, ATF (Nationwide), Federal Reserve System, Forest Service	415.4750	30/406.4750	Agriculture Department (Nationwide), Forest Service, Post Office	415.7250	50/406.7250
			415.4875	31/406.4875	Forest Service	415.7375	51/406.7375
415.2625	13/406.2625	(No reported activity)					
415.2750	14/406.2750	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Food Safety and Inspection Service, Forest Service, Post Office, Soil Conservation Service, Veterans Administration	415.5000	32/406.5000	Agriculture Department (Nationwide), Bureau of Land Management (Nationwide), Drug Enforcement Agency, Federal Reserve System, Forest Service (Nationwide), Navy, Post Office, Soil Conservation Service (Nationwide), Veterans Administration	415.7500	63/406.8875
			415.5125	33/406.5125	(No reported activity)	415.9000	64/406.9000
415.2875	15/406.2875	(No reported activity)					
415.3000	16/406.3000	Agriculture Department (Nation-	415.5250	34/406.5250	Agriculture Department (Nationwide), Animal and Plant Health Inspection Service, Forest Service, NASA	415.9125	65/406.9125
			415.5375	35/406.5375	(No reported activity)	415.9250	66/406.9250
			415.5500	36/406.5500	Federal Trunk Group 2 (paired with 407.5500): Agriculture Department (Nationwide), Air Force, Army, Bureau of Prisons, Energy Department, NASA, Navy, Post Office	415.9375	67/406.9375
						415.9500	68/406.9500
						415.9625	69/406.9625
						415.9750	70/406.9750
						415.9875	71/406.9875

TRACKING THE TRUNKS

TECHNOLOGY, EQUIPMENT, FREQUENCIES AND NEWS

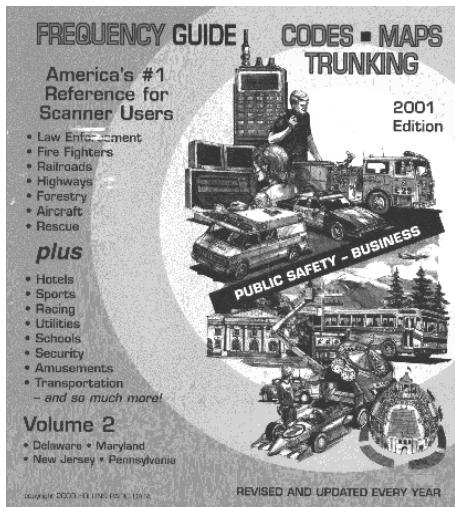
Dan Veeneman

dan@signalharbor.com

Travel Tips

Summertime usually means vacations, and that means taking your scanner on the road. Planes, trains, and automobiles can get you where you want to go, but being able to monitor can make for a more enjoyable and often safer trip.

Preparation is the key. First, map out the areas you'll be traveling to, and any interesting areas along the way. Then locate frequencies for those areas.



Finding Frequencies

The traditional method for finding frequencies is to use a publication such as *Police Call*. My 2001 Edition is well used, and I'd recommend bringing a copy of the proper volume along on your trip. It doesn't need batteries and there's room to make notes or update listings. Also, if the fish aren't biting or you're stuck in your tent during a rain storm you can pass the time by reading the Listener's Guide in the front section of the publication, which provides an excellent introduction to radio monitoring in general and scanning in particular. There's also a separate section on trunked radio systems.

The computer age has brought us an alternative way to locate specific frequency and talkgroup information, and that is via the World Wide Web. A number of websites cater to the trunked radio listener, and I'll list a few of the more popular ones here:

<http://www.trunkedradio.net>

operated by Lindsay Blanton, offers extensive frequency and talkgroup lists sorted by state. The site also provides news, equipment information, and computer software related to trunked

system monitoring. It's very good, very detailed, and very well maintained.

<http://www.bearcat1.com/fleet.htm>

run by the Bearcat Radio Club, provides listings of frequencies and talkgroups for the United States and many foreign countries.

<http://www.trunktracker.com>

by Trunking Technologies, LLC, also lists frequencies and talkgroups

<http://home.att.net/~wwhitby/>

run by Warren Whitby, contains frequencies and talkgroups, although they don't appear to have been updated for quite some time.

I would also recommend using a search engine such as <http://www.google.com>, which may help to locate frequencies not easily found elsewhere. Using keywords like "trunked" and "talkgroup" along with the city or county of interest will often turn up a wealth of information.

Conventional Frequencies

Besides state and county police, don't forget about federal agencies. For example, the U.S. Fish and Wildlife Service and the National Park Service are two organizations that may be involved in survey, protection, and even rescue operations during the summer. Warm dry weather often means forest fires out west, and frequencies used by the U.S. Forest Service are often busy with firefighting traffic.

Fish and Wildlife Service may be found at 34.8100 and 34.8300 MHz, as well as 408.6750, 408.7500, and 410.6250 MHz.

<http://www.geocities.com/CapeCanaveral/9952/nps.htm> has listings by state of National Park Service operations.

<http://web.csuchico.edu/~cw38/freq/agriculture.html> lists U.S. Department of Agriculture and U.S. Forest Service frequencies related to aerial firefighting in Northern California.

If your scanner doesn't already have it built in, you may want to add the National Oceanic and Atmospheric Administration (NOAA) weather frequencies. NOAA operates more than 500 radio stations across the country, broadcasting weather forecasts and alerts 24 hours a day. The seven nationwide frequencies are 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550 MHz.

I'd be interested in hearing about other frequencies, whether trunked or conventional, that you're using during your summer road trips.

Project 25 Scanner in the works

At the end of April, Uniden America announced they are expecting to manufacture a scanner capable of decoding trunked Project 25 radio signals within a year or so. Their primary customer focus for this new scanner appears to be news gathering organizations, who are increasingly shut out from police and fire radio transmissions due to the digital nature of Project 25 and the current lack of consumer digital receivers.

Also, at the Dayton Hamvention in May, the ScannerMaster booth had a sign reading

APCO-25 Digital Monitoring Solution

Scanner/Receiver Drop-in Board

Available in 2001

Offers low-cost solution for receive-only
Also provides all-band analog trunked/
conventional reception

This Drop-in Board is apparently the long-rumored addition to the Uniden Bearcat 780XLT scanner and is being developed by Greg Knox and Rich Barnett.

Uniden expects that public safety agencies may move to encrypted communications once Project 25 scanners become widely available, in order to maintain the relative privacy from scanner listeners they now enjoy. Encrypted signals would be illegal to monitor under federal law, but Uniden speculates that news organizations may petition to Federal Communications Commission (FCC) to make an exception for public safety systems paid for by public tax dollars.

In addition, even though Motorola, the primary manufacturer for Project 25 equipment, would be happy to sell encryption devices to public safety agencies, it's not clear that counties and municipalities will be willing to spend additional dollars in the face of public opposition. Only time will tell.

Fleet Map Programming

Dan,

When it comes to actual scanner programming, I am still unclear about how to use a Fleet Map. For instance, I am attempting to program Jefferson County in Arkansas. The web site shows Fleet Map: B0 = S13; B4 = S12; B6 = S12

Hence, B0 uses 4 blocks, B4 uses 2 blocks and B6 uses 2 blocks for a total of 8.

If I am required to program all eight blocks,

what do I put into the scanner? For instance, what would go into the first block? Would this be S13?

I am assuming that B1, B2, B3, B5, B7 are left without any entry.

The way I understand this, only three entries are required to finish the fleet map. That is, B0, B4 and B6.

I have both a BC245 and Pro-90.

Am I on the right track? Sorry, I am substandard in my understanding of this left-brained process.

David

David, don't feel bad. Fleet Maps can be rather confusing at times, but you are indeed on the right track.

Jefferson County, Arkansas, and the city of Pine Bluff use a Motorola Type I analog system. I have conflicting frequency information: one source shows 856.2375, 856.9625, 857.2375, 857.9625, 858.2375, 858.9625, 859.2375, 859.9625, 860.2375, and 860.9625 MHz in use; the other reports only 856.4625, 857.4625, 858.4625, 859.4625, and 860.4625 MHz. Perhaps David or another Arkansas monitor can clarify the situation.

In any case, the Fleet Map information of B0 = S13, B4 = S12, and B6 = S12 breaks down like this. Recall that there are eight blocks in a Type I system. Each block has an associated size code, which can range anywhere from S-1 to S-14. Most size codes fit in a single block, except for S-12, S-13, and S-14. S-12 fits in two blocks, S-13 fits in four blocks, and S-14 fits in eight blocks.

For the Jefferson County system, then, all eight blocks are taken up by the three size codes. Blocks 0, 1, 2, and 3 contain size code S-13, blocks 4 and 5 hold S-12 and blocks 6 and 7 hold a second S-12. A size code of S-12 allows for up to 16 subfleets and 1024 individual unit identifiers. S-13 also supports 16 subfleets but can have as many as 2048 individual identifiers.

Block	0	1	2	3	4	5	6	7
Size Code	S-13		S-12		S-12			

More information about Fleet Maps can be found in my August 2000, *Tracking the Trunks* column. Instructions for programming fleet maps into the BC 245XLT begin on page 56 of the *Owner's Manual*. None of the sixteen predefined fleet maps match the Jefferson County system, so you'll need to create a "User Defined" fleet map. To do this on the BC 245XLT perform the following steps:

- Be sure the proper frequencies are already programmed into a selected bank.
- Turn on the radio.
- Press and hold the [TRNK] button until **BANK** and **TRUNK** begin flashing.
- Select the trunking bank you wish to use.
- Use the [Down/Limit] button until **E1** appears in the display.
- Press the [E] button.
- Press the [DATA] button. **E1P1** should appear in the display.

- Press the [Down/Limit] button until **USR** appears in the display.
- Press the [DATA] button. **b0** should appear on the left side of the display, indicating that the radio is waiting for the size code for block 0. In the center **S-0** should appear, indicating that block 0 is set to a size code of 0.
- Press the [Up/Hold] or [Down/Limit] button until **S-13** appears in the center of the display.
- Press the [E] button. This selects size code S-13 for block 0. The radio should now display **b4** on the left side of the display and **S-0** in the center. It has automatically skipped blocks 1, 2, and 3, since they're taken up by the S-13 in block 0.
- Press the [Up/Hold] or [Down/Limit] button until **S-12** appears in the center of the display.
- Press the [E] button. This selects size code S-12 for block 4. The radio should now display **b6** on the left side of the display and **S-0** in the center. It has automatically skipped block 5 since it is taken up by the S-12 in block 4.
- Press the [Up/Hold] or [Down/Limit] button until **S-12** appears in the center of the display.
- Press the [E] button. This selects size code S-12 for block 6. The radio should now display **b0** on the left side of the display and **S-13** in the center. It has automatically skipped block 7 since it is taken up by the S-12 in block 6.
- Finally, press the [SEARCH] button to exit the programming mode and begin searching for the control channel.

To finish out David's letter, here are some talkgroups in use on the Jefferson County system:

Arkansas State Police (Troop E)

Dispatch	000-0
Dispatch	000-1
Administration	000-3
Investigations	000-4
Tactical #1	000-5
Tactical #2	000-6
Car to car	000-15

Also, the Arkansas Department of Transportation uses talkgroup 400-12, and the State Police may use talkgroup 400-09 as a link to the local Sheriff.

◆ Illinois STARCOM 21 Update

From a source that would rather remain anonymous comes this information about the new STARCOM 21 system for the state of Illinois:

Dan, I know a good bit about the Illinois STARCOM 21 project. It will be a Motorola ASTRO Digital SMARTZONE system. Initially there will be about 6,000 units on the system, (Illinois State Police units) with more state agencies to follow if the funding is available.

The EDACS system in District Chicago will be taken over by Motorola and most of the down-state frequencies will be 821 MHz state frequencies.

Motorola is in the process of determining transmitter sites. As many of State of Illinois sites as possible will be used to save money. As of this

date Motorola is in contract negotiations with the State and no contract has been signed yet.

I believe the central part of the state will be the first phase with the north and south following. The coverage required will be 95% of the state.

Take care and I enjoy your column. By the way, the Illinois Department of Corrections currently has nine Smartnet systems, most are analog but a couple are mixed mode (digital and analog).

That's all for this month. I welcome your electronic mail at [dan @ signalharbor.com](mailto:dan@signalharbor.com), and you can find more information and previous columns on my website at <http://www.signalharbor.com>. Until next time, happy monitoring & safe travels.

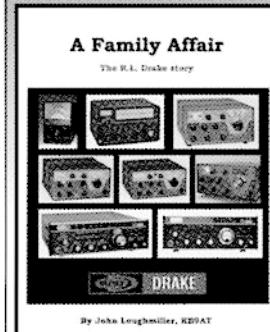
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Air Show Update

"Smoke on!"

"Up we go – a little more pull – a little power!"

"Standby boards – boards!"

"And we excite the audience with our world famous Blue Angel Fleur-de-lis!"

That is just a sampling of some of the chatter on the scanner that Milcom listeners have enjoyed this year now that the military air show season is in full swing throughout the country. An estimated 15 million fans for the Blue Angels alone will flock to sites all over the United States to catch the fun and excitement of flight demonstration teams stepping through their high flying paces. But the Milcom radio enthusiasts get an added extra dimension to the show by monitoring the flight demonstration teams on their scanners.

A few of our MT Milcom readers have submitted air show reports. So at the mid-point of the air show season, here are those reports.

❖ West Coast Report

Mark Zurovski, in southern California, passes along the following observations from the first air show of the season back in March at Naval Air Station (NAS) El Centro and a little extra material discovered during the show from Marine Corps Air Station (MCAS) Yuma.

120.375 MHz(AM) Friday morning the tower handed this frequency out to the civilian performers who wanted to practice before Saturday's show. They established an aerobatic box in one of the restricted areas and were told to contact "Shadetree Control" for range entry.

123.150 MHz(AM) Air show discrete. Used by all performers, including the F-16 (the only military performer other than the Blues).

138.525 MHz(Narrowband FM—NFM) was referred to as the 'weapons frequency' and was used for the 'bombing and strafing' passes coordination. Standing next to an Explosive Ordnance Demolition (EOD) van using his Optoelectronics Scout frequency counter Mark heard this every time the operator keyed his mike.

139.600 MHz(NFM) Mark says he was a little confused by this one. His Scout frequency counter found it Saturday morning and it seems the Airshow boss on 140.900 MHz was able to talk to a variety of support nets in this list on this frequency. Sounded like some kind of 'Airshow All Call.'

139.800 MHz(NFM) Medical and ambulance dispatch net. (*I believe the input to that repeater is one 149.525 MHz-Larry*)

140.025 MHz(NFM) Motor Transport Dispatch.

140.300 MHz (NFM) Fuel arrangements for aircraft. They called it "POL/Hazmat."

140.900 MHz(NFM) Air boss-Ground boss-Show boss. This guy controlled everything moving on or flying over the airfield. But not being able to talk directly to aircraft made for some interesting conversations.

141.150 MHz (NFM) Military Police used for crowd and parking control.

142.800 MHz(NFM) Public Affairs Officer net coordinating VIP accommodations and arrangements. This one was referred to as the "PAO frequency."

143.700 MHz(NFM) Used to arrange food and breaks for the various vendors. A lot of miscellaneous stuff on this one.

250.250 MHz(AM) This frequency was handed out by 279.2 controller. The ground controller here IDed themselves as "BIGFOOT CONTROL" and worked several SHOOTER and DEVIL call signs aircraft. It was not show related. (*I think you will find that this one is associated with the Yuma Tactical Range-Larry*)

279.200 MHz(AM) Mark said he found this new frequency in the *Grove Military Frequency Directory*, formerly the by-state *Monitoring the Military* series). Used as a tactical for most of the day on Friday. Heard conversations like "Tapes On, Fights On." Weapons load outs, laser targets and what sounded like a Forward Air Controller. Mark did not hear any call signs and these comms were not show related.

299.500 MHz(AM) Noted in the March Milcom column as a F-14 team frequency, during Friday morning of the show SHOOTER 21 was troubleshooting what sounded like a minor problem with his jet on this frequency with his wingman. These comms were not show related. (*This is a known 3^d Marine Air Wing, VMA-214 squadron tactical frequency-Larry*)

407.500 MHz(NFM) Navy Leap Frogs Parachute Team (cancelled both days due to high winds).

410.150 MHz(NFM) Mark found this frequency with his Scout. No voice, just every 15 or so seconds some kind of data or something. (*Interesting since this is a big trunk system frequency nationwide. Other reporters attending air shows this season please be on the lookout for this frequency-Larry*)

Mark also programmed the frequencies we published in the March issue of *Monitoring Times* for the Blue Angels team and heard the following in use during the show.

143.600 MHz (NFM) Communications cart. Used for show coordination. 164.900 MHz (NFM) In use several hours before the show for chat and show coordination. Also used by the jets for the cockpit checklist and taxi out. Used by Boss and Maintenance Office (MO) at prestart (according to Pena, see report below).

265.350 MHz(AM) Fat Albert (Marine C-130) JATO demonstration and fly-by communications

275.350 MHz(AM) In use before the show for chat and for the four jet diamond formation off show center.

307.700 MHz(AM) Used by both the solo and diamond formation at show center. Used by opposing solos aircraft off show center.

345.900 MHz(AM) Short weather reports prior to the show and used by the solo aircraft at taxi out and off show center.

Fred Pena was also at the El Centro air show. He confirmed Mark's list above and adds 143.000 MHz (NFM). He states that this frequency was used by a tower observer. Mark also observed a Blazer, with government plates, parked next to the static AV-8B aircraft. There was a UHF blade antenna bolted to the top of the vehicle. He looked inside and found the following frequencies listed on the card taped to the radio.

Yuma Presets

1	ATIS	118.800
2	Range	274.000
3	Gnd	315.700
4	Twr	382.200
5	Dep	281.000
6	Apr	374.800
7	Tac 1	382.925
8	Tac 2	318.925
9	Tac 3	326.925
0	Base	242.200

Yuma Harrier Aircraft Discretes

	VMA-211	VMA-214	VMA-311	VMA-513
Base	328.100	269.700	262.900	242.200
Tac 1	273.800	314.850	293.100	382.925
Tac 2	318.700	299.500	352.300	318.925
Tac 3	382.100	281.900	322.150	326.925
Tac 4	316.950	302.900	320.575	Unknown

(Note: I think 287.800 might be VMA-513's Tac 4-Larry)

Mark remarks, "299.500 MHz looks like a pretty popular frequency. In years past here in SoCal the F-16 teams have used simply 123.400 MHz for pilot/maintainer talk. I have noted this at Vandenburg, Miramar, El Toro (while still open), Mugu and El Centro. I did not hear anything on that freq this time even though the F-16 Demo team had a jet for the show."

Mark also attended the Point Mugu air show in April. Here is some of that report.

"The frequency 276.675 MHz was used by the East Coast Air Force F-15 Flight Demonstration Team and their tailcode was 'FF.' Last year the West Coast F-15 unit, tailcode 'EG' used 384.550 MHz." ("FF" tailcode belongs to the 1st Fighter Wing based at Langley AFB, Virginia and the "EG" tailcode belongs to the F-15 aircraft of the 33rd Fighter Wing out of Eglin AFB, Florida-Larry.)

"VR-55 had a couple of their C-130 aircraft open and 344.5 MHz was on a frequency card as VR-55 Base Operations. (VR-55 is based at Point Mugu-Larry.) Using my Scout frequency counter, I found 406.800 MHz carrying a simulcast of 124.850 and 382.800 MHz; both frequen-

cies are the Point Mugu tower. I have also found 410.025 MHz carrying both 121.600 and 360.200 MHz which are Point Mugu ground freqs. Point Mugu still uses frequencies in the 138-144 MHz range, but may they may be in transition to a trunk system."

◆ Miscellaneous Reports

Brian A. Topolski in Connecticut has been listening on the air show circuit and passes along some notes from recent events he has attended.

"In addition to the 413.025 and 413.100 MHz narrowband FM mode (NFM) ground frequencies listed in the *MT* March issue for the **Air Force Thunderbirds**, I can confirm 413.275 MHz (NFM) is also being used by the Thunderbird maintenance/ground personnel. I have also monitored the **Canadian Snowbirds** flight demonstration team on 245.750 MHz (AM)."

Also, Brian heard during the **Naval Air Station Oceana Airshow** in 1999, two F-117 aircraft from the 49th Fighter Wing/8th Fighter Squadron using 304.900 (AM) as a discrete squadron communications frequency.

James MacDonald from New England confirms Brian's 413.275 above and adds 413.250 and 413.375 MHz (NFM). James attributes the move to the regular T-bird ground channels being in use at the base they were visiting.

At the end of last season, Laura Quarantiello caught the **Blue Angels** at MCAS Miramar on media day. In additional to the frequencies mentioned above, Laura adds 238.150 (air-to-air), 123.150/315.600 show control.

MT reader Ronnie Stroup, KB8LNP in Ohio, passes along the following frequencies from a recent **US Balloon Team Nationals** and air show.

118.500	Tower
121.700	Ground Control
122.925	USAF STARS Parachute Team
123.100	Air Boss
123.150	Red Baron Squadron
136.975	Northern Lights, Mike Goulian (hot mic)
143.850	Thunderbirds – Diamond
173.440	Announcer
272.100	Canadian Snowbirds
322.950	Thunderbirds – Solos
413.025	Thunderbirds – Ground Control

Charles McAtee from Martinsburg, WV, monitored the following frequencies during a recent **Andrews AFB** show (all NFM):

170.900	USN Blue Angels - Ground Ops: This was the best frequency to listen to for information
409.350	Andrews AFB Security
413.200	Andrews AFB Security - Bike Patrols
413.275	USAF Thunderbirds - Ground Support
413.375	Andrews AFB Security

One of our overseas friends, Dudley in the UK, confirmed that the **UK Air Force Red Arrows** Flight Demonstration Team is using 243.450 MHz. for their show communications.

I want to also acknowledge air show reports from John Coker, Charles Ebert, Ric Garcia and Alan Sifford which confirmed material that

has been presented above. Thanks to all above for sharing your air show reports.

So, what about you? If you attend an air show this season we want to hear from you, even if you're confirming frequency material we have presented here in Milcom. Contact us at the email address in the masthead.

◆ Air Station Beaufort Profile

An old friend down in South Carolina, Ron McCormick, KF4LMT, provides this month's military base profile, MCAS Beaufort, South Carolina (KNBC).

Frequency Listing – Air Traffic Control

119.050	Tower
340.200	Tower
360.200	Tower
128.150	Ground Control
336.400	Ground Control
118.450	Approach/Departure (above 3000-ft)
301.200	Approach/Departure (above 3000-ft)
123.700	Approach/Departure (3000-ft and below)
251.700	Approach/Departure (3000-ft and below)
278.800	ATIS
281.800	Base Operations

Miscellaneous Frequencies

269.700	Tactical Control
349.800	Beaufort Warning Area Control
264.000	Marine Group Common, possibly Wing Common
344.200	Thought to be the VMFA(AW)-332 command post, but it is still used occasionally – unknown purpose

◆ Squadron Frequencies

Note: All frequencies with designators confirmed through monitoring are marked with an asterisk

VMFA-115 "Silver Eagles" F/A-18A
Tailcode: BM (VE) # # Callsign: BLADE
313.800 Command Post
320.200 TAC 2 probable but unconfirmed
321.900 TAC 3? (referenced 16 Feb 2001)
and 258.100 258.900 336.925 361.100

VMFA-122 "Crusaders" F/A-18A
Tailcode: BM (DC) Callsign: NICKEL
251.400 TAC 2?
251.900 TAC 1*
and 250.300

VMFA(AW)-224 "Bengals" F/A-18D
Tailcode: BM (WK) 5 # # Callsign: BENGAL
305.800 Command Post*
250.300 TAC 1 probable but unconfirmed
258.900 TAC 2 probable but unconfirmed
270.800 TAC 3?
and 374.250

VMFA-251 "Thunderbolts" F/A-18C
Tailcode: BM (DW) AB 2 # # Callsign: T-BOLT
345.800 Possible CP
315.300 TAC 1*
318.500 TAC 2 probable but unconfirmed
251.900 274.050 303.000 321.900 358.150 379.150

VMFA-312 "Checkerboards" F/A-18C
Tailcode: BM (DR) AC 2 # # Callsign: CHECK
253.100 Squadron Common*
301.950 TAC 1?

320.300 TAC 2?
and 251.900 321.900

VMFA(AW)-332 "Moonlighters" F/A-18D

Tailcode: BM (EA) 4 # # Callsign: SKULL

361.800 Command Post "SKULL BASE"

326.700 TAC 1*

333.300 TAC 3?

346.600 TAC 2*

and 245.500 361.000

VMFA(AW)-533 "HAWKS" F/A-18D

Tailcode: BM (ED) Callsign: HAWK

253.100 HAWK OPS questionable, unconfirmed

283.400 TAC 1*

354.700 TAC 2*

and 326.700

VFA-82 "Marauders" F/A-18C

Tailcode: AB 3 # # Callsign: CARR

265.900 (tentative) and 333.300

VFA-86 "Sidewinders" F/A-18C

Tailcode: AB 4 # # Callsign: WINDER

250.700 Command Post reported, but not confirmed through monitoring

256.250 frequently used

263.600 281.200 292.900 299.500

Thanks, Mac, and to all our reporters this month. Until next time, 73 and good hunting.

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Join the Club

Sitting alone in the radio room, with the headphones on and nobody else around, broadcast DXing appears to be a solitary hobby. For the most part, it is. Getting in touch with other DXers can make the hobby more enjoyable and productive. The domestic bands change quickly; club membership brings you the latest information on new and changed stations, tests, and the temporary or permanent absence of DX-killing pests.

There are three clubs that serve the domestic-band DXer in North America. All three have many things in common. All publish a regular newsletter, 30-40 pages in length. These newsletters detail new stations, technical changes to existing stations, and changes in programming format. Also present are reports of DX logged by club members. (The reports of nearby DXers can be quite helpful in identifying your DX, or knowing what frequencies to target.) Finally, there are technical articles on propagation, antennas, and equipment.

The National Radio Club (<http://www.nrcdxas.org>) serves AM DXers. 30 issues of *DX News* are included in a \$26 (in the U.S.) one-year membership. Send a 34-cent stamp to *DX News*, 2840 S.E. Illinois Ave., Topeka KS 66605-1427 for a sample newsletter.

Also serving AM DXers is the International Radio Club of America. (<http://www.geocities.com/Heartland/5792/>) Their *DX Monitor* publishes 34 issues a year for a \$25 membership. A sample can be had for a 34-cent stamp to *DX Monitor*, P.O. Box 1831, Perris CA 92572-1831. The IRCA also has a "soft DX Monitor," an Internet version of the regular newsletter. Subscriptions to this service are \$10/year.

FM and television DXers are served by the Worldwide TV-FM DX Association. (<http://www.anarc.org/wtfda>) *VHF-UHF Digest* comes out monthly; dues are \$24. Send \$1 to WTFDA, Box 501, Somersville CT 06072 for a sample issue.

These organizations are a great way to keep up with changes on the dials. Check them out!

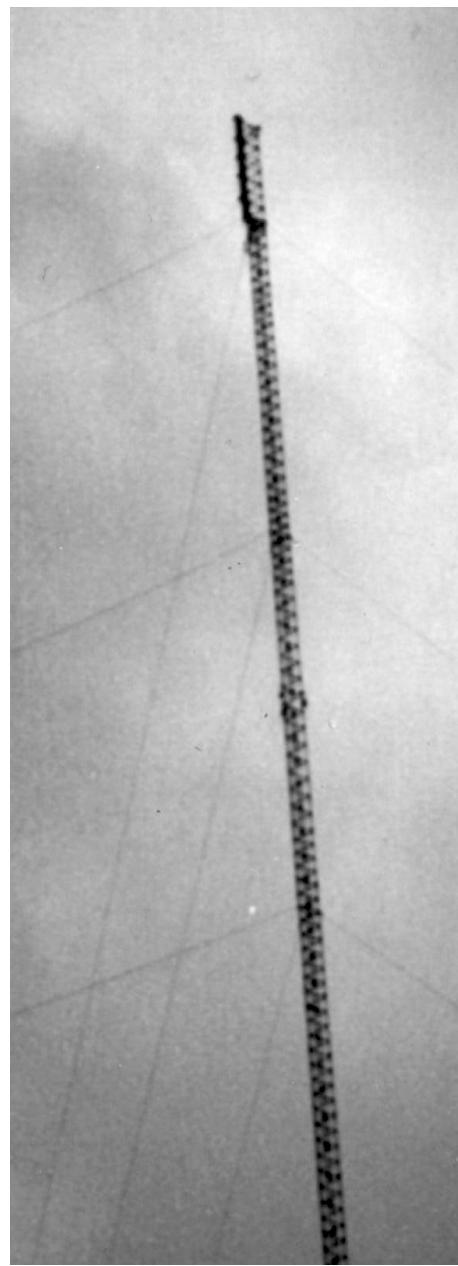
◆ Bits and Pieces

* As you read in *Communications* in the May issue, the FCC has begun to issue low-power

FM (LPFM) permits. So far, 25 permits have appeared in the Engineering Database; the stations are located in California, Georgia, Indiana, Louisiana, Maryland, Maine, and Oklahoma. Additional permits have been issued in other areas but have not yet appeared in the database. Some FM DXers claim these little stations will ruin DXing in major cities, but they also provide additional DX targets.

- * Another "non-test" occurred in late April. WLS-890 posted notice on their website that they'd be going off the air for five hours on a Sunday morning. Internet reports indicate that most DXers heard Radio Progreso, Cuba, in WLS' absence. It pays to keep a close watch on the dial. You never know when that ultra-strong "pest" that makes a frequency "un-DXable" will disappear!
- * A tragic – and unusual – event took place near Trois-Rivieres, Quebec, in April. In heavy fog, an airplane struck the tower holding the antennas of several TV and FM stations serving this city. The airplane got stuck inside the tower – but the tower did not collapse. Climbing the tower after such an accident was too dangerous, making it impossible to recover the plane or the pilot's body. Eventually, authorities were forced to dynamite the guy wires, bringing the tower down and allowing recovery.
- * WTFDA member Bill Eckburg sent a picture of the WWTO-TV tower, located near La Salle in northern Illinois. If you look carefully, you can see the transmitting antenna – a black pole sticking out from the side of the tower. Bill asks, "Why is their antenna on the southeast corner instead of on top of the tower?"
That's a good question, you'd have to ask the engineer who designed the station! I would venture a guess it has something to do with wind loading – the ability (or inability) of the tower to tolerate a tall and heavy antenna being blown around by the wind. Many other UHF TV stations are built the same way. If someone out there knows for sure why these UHF antennas aren't placed atop the tower, please write and let us know.

It's the peak of the sporadic-E "short skip" season. Who will be the first to log a LPFM station by skip? Will anyone catch a digital TV station by skip this year? If you do, let us know. Write: Box 98, Brasstown NC 28902-0098, or by email to w9wi@w9wi.com. Good DX!



This 1,300-foot tower near La Salle, Illinois, houses WWTO-TV, channel 35.

Do We Need an Unlicensed Broadcasting Band?

The news from shortwave broadcasting circles could hardly be more discouraging this spring. In moves of questionable wisdom, both *Swiss Radio International* and the *BBC* announced that they are abandoning shortwave programming to the Western Hemisphere. Despite claims from both broadcasters that alternative media will pick up the slack, listening audiences will fall in both Switzerland and the UK.

At the same time, the shortwave pirate broadcasting scene remains quite vigorous. It could be that the time has come to recognize that as regular broadcasting and utility stations gradually phase out shortwave, a high frequency allocation could productively be made for amateur broadcasting. Existing pirate users have been taking pains to avoid interference to other stations while maintaining good technical standards. Given the changing technical environment, reserving a tiny amount of HF spectrum for amateur programming could make sense. The public policy consequences of this move could be a refreshing counterpoint to continually increased concentration of broadcasting control in the hands of few large corporations.

What do you think? Let us know at *Monitoring Times*.

New ACE Publisher

Association of Clandestine radio Enthusiasts announces that well-known and respected DXer and author Harry Helms has taken over the reins as *ACE* publisher. Harry, of LLH Publishing and eBook Tech, assumed control in June. Harry's renewed activity in the hobby has been welcomed by many. But, *ACE* subscriptions still go via the Belfast address listed below.

What We Are Hearing

MT readers heard all of these stations this month. Most were on or near 6955 kHz, but stations still move down to around 6950 kHz at night to avoid interference from Peru.

Blind Faith Radio- Dr. Napalm inevitably programs classic rock selections. (Uses blindfaithradio@yahoo.com e-mail)

Buckwheat Radio- Rock and dance music has been the fare on this one so far as they perform technical equipment adjustments. (Uses buckwheatradio@hotmail.com e-mail)

Crunch Radio- Their format changed to ancient 1930's pop tunes. They announced a final broadcast, but their demise is not yet certain. (None, QSLs FRN postings)

Eat It Radio- A "I Hate Tiger Woods" broadcast was counter to the feelings of most

sports fans. (None)

KHJ- A new one this year, their slick rock music shows with jingles are a close imitation of commercial radio. (None)

KIPM- Without any doubt, Allan Maxwell holds the all-time pirate record for most elaborate drama productions. (Elkorn)

Midi Radio- Here's a return of the computer-generated instrumental versions of rock music standards. (Uses midiradio@yahoo.com e-mail)

NASCAR Numbers Parody- The new fad of numbers station parodies has taken a new turn, with NASCAR auto race noises in the background (None)

Radio Bingo- The radio version of bingo seems fixed, with John T. Arthur winning every game. *Caveat emptor!* (Uses radiobingo@chek.com e-mail)

Radio Cochiguaz- Despite summer propagation, the best heard South American pirate remains active. They transmit some weekends between 2000-0200 and/or 0800-1100 UTC on 11400 UTC. (Santiago)

Radio Neptune- A recent rock music show featured Joe Mack. Is he possibly the same announcer from Z-100? (Blue Ridge Summit)

Radio Titanic International- This Europirate, with a 25 year history sometimes with North American relays, announced that it permanently left the air. They cited equipment failure, utility station interference, and a fake Radio Titanic from Holland. (Wuppertal)

Shadow Radio- Their IDs are from old "The Shadow" radio dramas, but they mix rock music and sketches with their old-time radio programs. (None)

Sycko Radio- By now their rock and comedy are a veteran pirate operation, but they still do not communicate with their listeners. (None)

Take It Easy Radio- Eagles soft rock music is often supplemented with documentary programming, including Vietnam war broadcasting histories. (Belfast)

United Patriot Radio- Clandestine Radio Watch has reclassified this one as a pirate, but its daily right wing rebellion programming still is heavily clandestine in nature. Frequencies vary among 3200, 6900, and 12182 kHz in upper sideband. (Not fully clear)

WBRY- The Rodent Freedom Fighters often bring this classic clandestine parody back to life around Easter. This year's Bunny Radio was no exception. (Announced maildrop defunct)

WHYP- James Brownyard, the legend of North East, PA, radio broadcasting, still peppers the pirate bands with creative shows. (Providence)

WMFQ- If you never received a pirate QSL before, these guys want to send one to you. (Providence)

Z100- This slick oldies pirate now has a web

site at www.z100fm.homestead.com/z100fm.html in addition to nearly a dozen shows over the air. (Uses bigz100fm@yahoo.com e-mail)

Reports and QSLs

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. This finances postage for a souvenir QSL to your mailbox. Send your letters to these addresses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 69, Elkorn, NE; 68022; Postfach 220342 D-42373 Wuppertal, Germany; and Casilla 159, Santiago 14, Chile. A few pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. Reports to the Free Radio Network (FRN) go to <http://www.frn.net/> on the web. Free Radio Weekly loggings go via niel@ican.net e-mail. Sample copies of *The ACE* are \$2 via the Belfast maildrop.

Thanks

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We thank every one of our contributors: John T. Arthur, Belfast, NY; Artie Bigley, El Paso, TX; Ranier Brandt, Hoefer, Germany; Cachito, Santiago, Chile; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Harold Fodge, Midland, MI; Tim Hall, Buffalo, NY; William T. Hassig, Mt. Prospect, IL; Harry Helms, San Diego, CA; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Big Mike, Belfast, NY; Craig Pradarelli, Necedah, WI; Fred Osterman, Reynoldsburg, OH; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Fred Roberts, Germany; Martin Schoech, Merseburg, Germany; Tom Sevart, Frontenac, KS; Lee Silvi, Mentor, OH; Bud Stacey, Setsuma, AL; Mike Stratus, Connecticut; Niel Wolfish, Toronto, Ontario; and David Zantow, Janesville, WI.



Pirate DXers in Kulpsville

LF Receiving Antennas, Part II

It's startling to realize this month marks 10 years for me as the editor of *Below 500 kHz*. I want to thank all of you for your letters, photos and loggings over these past 10 years. Whether you've been with the column since day one (as many of you have), or are just discovering the fun of the low frequencies, please know that I appreciate hearing from you. In fact, it's the best part of this job.

Life has gotten a bit more complicated for me since I began the column, notably with the arrival of two children, increased job responsibilities, and volunteer work in my community. Rest assured, however, that I always look forward to hearing from *MT* readers. My responses may not be as prompt as they should be, but I do read all mail (e-mail or otherwise) that is sent to me. How about writing me soon to give your thoughts on the direction this column should take in the future?

◆ Loop Antennas

Last month we discussed the ubiquitous "random wire" antenna, a good workhorse that can provide decent reception (and transmission, in some cases) over a wide swath of the radio spectrum. I use one at my location for a variety of SWL and ham radio activities.

As one gets more serious about longwave, however, there are other antennas that should be considered. Loops, for example, provide solid benefits that will be of interest to lowband connoisseurs. The primary benefit of a loop is *directivity*. It can be rotated to null out interference or "pest" signals while focusing on a desired signal. This technique is used by many DXers to log two or more stations on a single frequency.

A second benefit is low noise pickup. Their small size (relatively speaking) and closed-circuit design make them less of a "noise collector" than a 150-foot wire strung across a backyard. Signals may be somewhat weaker on a loop – unless it is amplified – but the *signal-to-noise ratio* is frequently much higher, and this is preferable to just having strong signals.

There are at least three types of loops that are popular today: Ferrite Loops, Multi-turn Tuned Loops, and Broadband Loops. The *Ferrite Loop antenna* is most common since one is hidden inside nearly every AM radio. These are the small black rods you have probably seen wound with fine enameled wire. The rod itself is typically made of a nickel-zinc mix that increases the inductance of the windings and concentrates an electromagnetic field around the antenna. In operation, ferrite loops provide sharp

nulls off their ends, and give a maximum response to signals approaching from their "broadside" planes.

Ferrite rods are among the smallest loops around, but they are generally not very efficient. An exception to this rule is an externally-tuned ferrite loop specifically designed for LF reception. These antennas typically couple to a set's internal ferrite rod via mutual inductance, or connect to the receiver with a short coax cable. Their larger size and tuning capability often provides greatly enhanced reception as compared with a stock internal antenna.

At present, commercial sources for high performance ferrite loops are limited. One firm that does carry them is RadioPlus+ Electronics of Pensacola, FL. You can check out their wares by sending e-mail to <http://radioplus@pecola.gulf.net>. You'll be emailed back a copy of their latest catalog as a file attachment. If you prefer conventional mail, send an SASE to them at 3635 Chastain Way, Pensacola, FL 32504.

Multi-turn Tuned Loops

are another antenna worth discussing. This design usually consists of a cross or box-shaped frame wound with several turns of small diameter wire. The windings are tuned to resonance at LF with a variable capacitor connected in parallel. A separate, one-turn "link" is placed in the middle of the tuned windings and provides a low impedance (50-100 ohm) connection to the receiver via a short cable.

Multi-turn loops are easy to build, and you can get plans for one by ordering a back issue of the September '92 edition of *Below 500 kHz* from *Monitoring Times*. (An optional preamp for this loop was in the November '93 column. Send \$3 for each reprint plus SASE.) Such a loop can be set on a tabletop and rotated to favor (or null) the signal at hand. One *MT* reader mounted his loop on an old music stand and is achieving excellent results.

A disadvantage of tuned loops is that they must typically be used indoors. Most designs are too fragile to mount outside in the wind, and

even if you did, there is the problem of tuning. Whenever you move more than 20 kHz or so, the loop must be retuned for maximum performance. It is possible to employ remote tuning, but the arrangement can become very complicated. The good news is that these loops seem to perform very well indoors!

Finally, let's discuss *Broadband Shielded Loops*. These antennas have a number of advantages that make them popular with DXers – among them: Low noise pickup, good sensitivity, tune-free operation and mechanical stability.

Shielded loops contain only one turn of wire, and they are electrically shielded except for a very small portion (an inch or so) at the top of the loop circle. Shielding causes the loop to respond principally to the magnetic component of an incoming electro-magnetic (RF) signal, and reduces its susceptibility to electrical field noise.

Shielded loops typically contain a wideband (10-500 kHz) preamplifier, so there's no need for tuning the antenna as you move

across the band. In a well-designed loop, the preamp begins "rolling off" above 400 kHz and becomes nearly "deaf" above 500 kHz to minimize AM broadcast overload.

Finally, shielded loops are made of a rigid or semi-rigid material such as copper pipe or "hardline" coax, so they can be easily mounted outdoors on a simple mast and turned with a TV rotor.

To build a shielded loop I highly recommend VE3OT's web site at <http://technology.fanshawec.on.ca/tele410/loop.htm>. Here, you'll find information for building two types of high performance loops. An excellent general reference on loop antennas is Joe Carr's *Loop Antenna Handbook*, available from Universal Radio Research, 6830 Americana Parkway, Reynoldsburg, OH 43068. It contains over 130 pages of descriptions, plans and theory for many types of loop antennas.

Next time, we conclude the series with a discussion on active antennas.

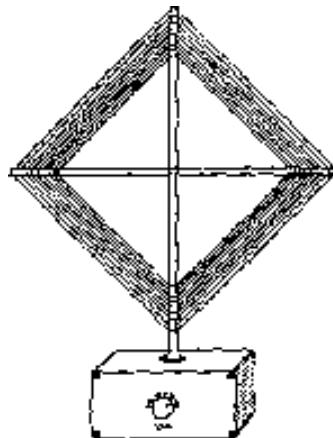


Figure 1. Multi-turn tuned loops have been around for a long time. They provide excellent performance on longwave, often surpassing the performance of wire antennas, particularly in noisy environments.

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Ragchewing and Other Fun

It should be no surprise to anyone reading this column to learn that I am, by nature, a "Rag Chewer." People get on the ham bands for all sorts of reasons. They may be interested in contesting. Maybe chasing DX. They could enjoy trying new and exotic modes. There are dozens of possibilities. But as a general rule, when I sit down in the evening to play radio, I'm looking for a bit of conversation. The topic and subject matter matters not. I just like to talk ham to ham about any subject under the sun (including the sun). And that rag chewing isn't limited to the voice modes. More often than not I'm working CW when I chew the rag. The other person in the QSO could be next door or on the other side of the world. I still have just as much fun. That is the primary symptom of Rag Chewer's Disease: an overabundance of fun.



Over the years I have talked to people from all walks of life. Military generals, priests, writers, musicians, professional sports figures, and people who were around when radio was young – these are only the tip of the iceberg of interesting rag chew QSOs I've enjoyed. Once you get beyond the basic signal report, equipment and local weather report, then the QSO can *really* begin as you get to know a lot more about your fellow

ham's interests.

I get a kick out of running across folks who mention in the course of the QSO an interest I share. Motor sports, science fiction, "Old Time" radio programs, and Sherlock Holmes are all subjects that have kept me up way past my bedtime on both local repeaters and low bands. Or, maybe I'll get lucky enough to meet someone who has much to tell about a subject I know nothing about. Learning something new is always exciting. Most of my basic training in computers occurred on the ham bands long before I could muster up the money to buy my own PC. Now, in the world beyond writing this column, I am a senior staff member of an Internet/Intranet design team. I guess you could say I'm feeding my family thanks to things I learned rag chewing on the ham bands.

It's not hard to develop the basic skills to be a good rag chewer. A simple "so tell me a little about yourself" can go a long way to getting the ball rolling. A tried and true trick of the rag chewer trade is an atlas. Once you figure out where the other person is from, you can take a look in the book and go from there. "So Mark, I see you live in Ohio; I guess you've been to the Dayton Hamfest. What's that like?" Or maybe, "Ed, you live on Long Island, what's the ham activity like in New York City? Is it all repeaters or are there folks on the low bands?" You can even move off of ham-based subjects. "Jon, I see that Hopewell is near Princeton. I bet there are lots of fun things to do in a University town like that."

I find a lot of conversations these days can be started by mentioning that Number One Son is in college. Lots of hams have kids in college, out of college or looking to go to college. Talking about where your kids and your money are going can go on for hours.

I find you can always tell a really great rag chew by how it ends. It's always interrupted by something (phone, the need to get to bed) or someone (XYL, dog scratching at the door) else. The hams involved are having too much fun to call it quits. You may even set up a sked to pick up where you left off again next evening.

If you really enjoy talking over the radio as much as I do, you can go for a great award. The American Radio Relay League offers a certificate to folks who qualify to be members of The Rag Chewer's Club. Let me be-

gin by saying that the RCC is probably the least exclusive club in the world. But, it is a club that even Groucho Marx would have been proud to be a member of.

The purpose of the award is to encourage friendly, meaningful contacts, rather than the impersonal "name, rank and serial number" QSO. All you need to do is get on the air and have a conversational QSO for at least 1/2 hour. On your honor you report that QSO to ARRL HQ (225 Main St, Newington, CT 06111-1494), and enclose a fee of \$3.00. Your Rag Chewers Club certificate will be sent to you by return mail. So, if you want to, you could even use your very first contact as a licensed amateur to earn your first award.

◆ Worked All State "Quarters"

It was a fairly typical evening around N2EI. I had finished my home chores and had settled in for an hour or so of cruising the 40 meter CW band looking for one of those rag chews I was talking about. My CQ was answered by N3GC, the callsign of the Greene County Amateur Radio Association of Waynesburg, PA. The "OP" was a gentleman named Roger. After the normal exchange of RST and basic info, we got on to talking about jobs and other things in our lives. As the QSO drew to an end Roger told me of his club's efforts to encourage hams to exchange the new "State" quarters with one another.

As you know, the U.S. Mint is issuing a series of quarters for all fifty states over the next several years. I had seen those posterbooks in various stores designed for folks to collect the state coins. It should have been obvious that it would also be a neat way to work through "Worked All States." Well, of course I agreed and sent off a New Jersey quarter along with my QSL card. In return I received a very official looking N3GC Penn-

N3GC

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The Club That Started

"Worked All States"

Via the "State Quarter"

and hoping that other clubs will follow our lead.



73'S

sylvania quarter and QSL card. Since I've already earned my official QRO and QRP WAS awards, this is just the thing to get me chasing after states again. (Only now I think I'm going to try it with 1 watt, as we'll talk about in a few minutes). I encourage folks to talk this up on the bands and have some fun with it. Anybody can collect the 50 state coins, but hams can have their collection as a remembrance of 50 QSOs. Hats off to the Greene County ARA for promoting this wonderful idea.

◆ Making Up Your Own Contests

Many hams come up with some interesting ideas for making amateur radio more fun and exciting. One fairly common practice is to try to make contact with other folks with callsigns sharing the same suffix. Interestingly, in all the years I was WB2GHA, I never worked another station with the "GHA" suffix. However, since I've become N2EI I have already talked with K2EI and N1EI. I've stopped short of writing to the other members of the "EI" call group but I have heard of folks doing this. I guess the personal award would be "Worked All 'EI'"s.

On a similar note, I have heard of a number of families where all members are also active licensed amateur radio operators. They cross-match their logs and, if you have QSOs with each member of the family you will be issued a certificate noting this fact.

There is a practice with DX contacts that sounds fairly intense but some people get a kick out of the game involved. Here's how it goes. You work a station such as VE3ATI (Canada). The last two letters of that callsign become the PREFIX of the next country you seek out. In this case "TI" means the next country you want is Costa Rica. So then you work TI2CX. "CX" would make your next contact Uruguay. What you end up with is a series of QSOs linked prefix to suffix for as long as you have the desire to keep this up. Now imagine doing this all the way through to DXCC! Believe it or not, it has been done by a number of hams.

If linking your international prefixes and suffixes sounds a bit daunting, let me tell you about another fun self-imposed challenge that is actually a bit harder than it looks. How about setting out to work all State Capitals? Sound too easy? I've lived in New Jersey for my entire ham career and I've never worked a native-addressed station in the city of Trenton. This could be yet another way to generate a bit of extra fun.

Some people need a little push to get them to operate regularly. I've set a more or less informal goal to get on the air for at least one QSO every day. I do this not just because it's fun but I also realize that I could easily spend all my time doing other things, even those related to the radio hobby such as building and experimenting. All at the expense of time on the air talking to fellow hams. Get-

ting on the air every day is a bit like a musician practicing their scales. It keeps the skill set honed.

I know a number of hams who pledged to make 2000 contacts in the year 2000. That works out to a little more than five QSOs a day. Not too hard if you're into quick exchanges. A dedicated rag chewer like myself would need to quit his or her regular job to meet that goal. But any ham can find a comfort level and get into the habit of getting on the air on a regular basis.

◆ On Purpose Underachievement

A practice fairly common among QRP operators can really be taken up by most any ham. If you have a good contact going, and have made all your information exchanges and other comments to one another, agree to begin to reduce power. Do this in a systematic way. If you're running 100 watts, drop first to 75, then 50, then 25...get the idea?

As a dedicated low power operator I always start at 5 watts and work my way down to 1 watt or lower. If you have never tried this before you will be amazed at how little power it needed to maintain a quality QSO. If you operate CW instead of phone you will be even more amazed that QSOs can be maintained on mere milliwatts.

A variation on this theme is to rework awards or self-imposed challenges with progressively lower power levels. For example, as I mentioned before, I have WAS with 100 watts and 5 watts. Now I'm cranking things down to 1 watt (yeah, and I'm going to be going after those quarters, too!). Once I've achieved WAS with 1 watt I'll crank it down to 500 milliwatts. I'm pushing the envelope a bit because I want to first try to achieve 1 watt WAS on phone. This is a lot harder than with CW but while the solar cycle is up I think I have a good chance to pull it off on 10 and 15 meters.

There's always some new fun on the ham bands. Jump on in. If you want to rag chew I'll see you on the lower end of 40 meters!

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Continuing the SW-54 Restoration

Now that all of the books awaiting review have received their due attention (June 2001 column), we can get back to the National SW-54 restoration project. That project was announced in the May column. Back then, I gave you a little background information about the receiver and took stock of some of the restoration problems presented by the sadly neglected example in my workshop. I had to guess at the year of introduction of this cute little set, and I proposed that it might have been 1954 – the same as the model number.

◆ From the Mailbag

Since then, I've received some reader e-mails about the radio. Richard Gleitz tells me that he received an SW-54 as a gift from his parents when he graduated from high school in 1952. He still has the radio, and also the Howard Sams data folder for it, which is dated 1951. Perry Crabill, W3HQX, quoting from *Shortwave Receivers - Past & Present* by Fred Osterman, tells us that the SW-54 was manufactured from 1950-1957, and now sells for \$40-\$65 – close to its original price of \$50-\$60. Howard Ragan added some information about the National-equipped "Kon-Tiki" expedition mentioned in an ad for the SW-54 I ran in May. He tells us that the receiver on the raft was a National NC-173. He has a '173 himself and still uses it.

I should also mention that a restoration article on the SW-54 appears in the current issue of *The OTB*, newsletter of The Antique Wireless Association. I happen to be Editor of *The OTB*, but that article was written by Bill Fizette, AWA's President. See the AWA ad appearing with this column for more information about *The OTB*.

Before getting started I'd like to mention a couple of other reader e-mails relating to earlier "Radio Restorations" columns. Frank Adams, N6YP, is interested in restoring 1940-1960 communications receivers and had been looking around for an r.f. generator. He was pleased to find a Triplett 2432 like the one we worked on a few issues back and is now trying it out. Nick Terrence already had a signal generator (an Eico model), but wasn't sure how to

use it until he read about the Philco *Transitone* realignment discussed in the April 2001 column. This got him over his inhibitions and he went to work on the i.f. channel of a 1950s Sentinel 5-tuber with very good results.

◆ Cabinet Cosmetics

I decided to start the SW-54 restoration by working on the metal cabinet. To tell you the truth, I've been itching to go after it with some polishing compound ever since I took the set out of storage to begin this project. The painted finish (done in National's classic grey hammertone color) was generally dull, scuffed here and there, and bore the signs of an overzealous polishing attempt using

gleaming nicely – and most of the rust smears had disappeared.

Next, I turned my attention to the front-panel control markings. National's control labels in sets of this era are easy to rejuvenate because they are deeply engraved into the metal panel. I spent a little time in a paint store looking for some kind of touch-up stick I might be able to use to refill the "tired" letters. What I came home with was a wood filler "Blend Stick" made by DAP. It's normally used to repair scratches and small holes in furniture finishes and is available in several shades. White (shade 32) was the one I needed.

I rubbed the stick vigorously across each of the engraved labels until it stood out sharply from the panel once more and all of the "broken" parts were refilled. A few swipes with a cloth slightly dampened in mineral spirits removed the excess without taking any filler out of the engraved parts. The result: a quantum leap forward in cosmetic appearance!

I finished the job with an overall coating of hard floor wax, which I buffed to the best shine that elbow grease could provide. And while the result definitely does not look mint, it is quite pleasing to the eye – particularly when I remember how the cabinet looked originally! I'm not really through with the cabinet, though, because I still have to re-

place the missing metal rear panel with one salvaged from my very rusted parts set. More on the rehabilitation of that part in a later column. It's pretty rusty and grimy, but I am going to try the polishing compound and wax before I consider refinishing.

◆ Dealing with a "Nasty Chassis"

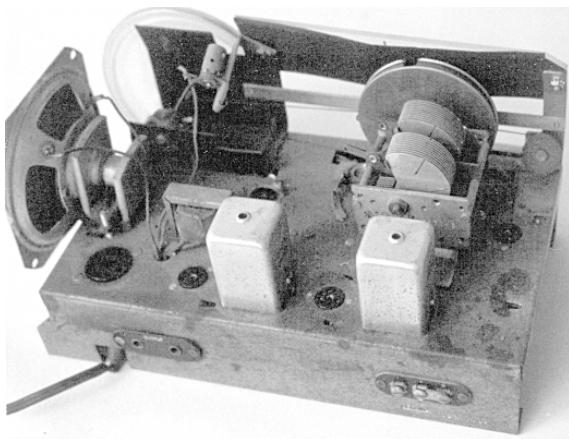
I think I mentioned the poor cosmetic condition of the top of the SW-54's chassis in my May article. Quite clearly, this equipment had been stored under less than ideal conditions. The copper finish of the metal (not sure if this was plating or some form of paint), was stippled and pock-marked everywhere with discolored areas, some particularly large and obvious.



The SW-54 cabinet after its "facelift." The old girl looks pretty good for age 50, doesn't she?

something a little too abrasive. Also, some of the scuffed, worn and dinged spots had begun to weep rust stains over the finish. The white control markings on the cabinet were yellowed and incomplete. Back in May, I promised that the cabinet would look decent once more – but remember that I asked you not to expect miracles!

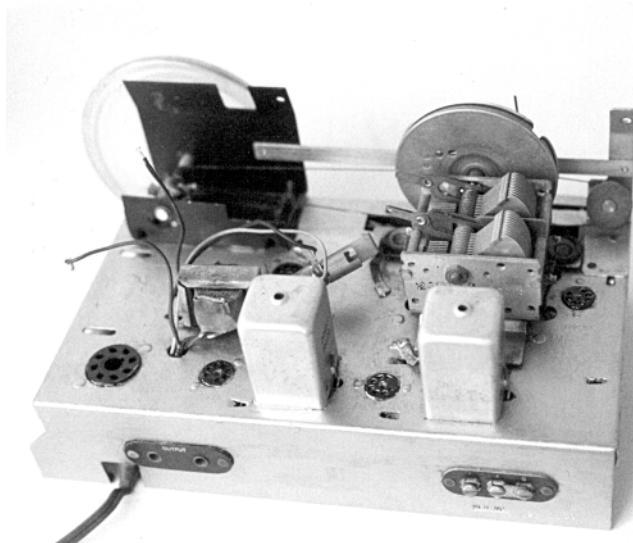
First I went to work on the finish with Turtle Wax Polishing Compound (available at any auto supply outlet for about \$2.00 a can). This was applied with a damp cloth, per instructions, then buffed with a soft dry cloth. After I did it once, I repeated the process. The results were really encouraging! Of course the scuffs and dings were still with me, but everywhere else the paint was evened out and



Here's a shot of the chassis just before I removed the dial and speaker for painting. Note the discouraging spots and speckles all over the surface of the chassis.

My first thought was to try the polishing compound because I think that a cleaned-up original finish, even if not perfect, is far preferable to a refinishing job. However, that treatment didn't even make a dent in the problem, and I decided to go shopping for some metallic copper brush-on paint. Spray paint would have been great, but masking of the many chassis items requiring it would have been a daunting job.

I finally found what I needed in a specialty paint store, but gulped when I saw the price (\$15.99 for a 6-ounce bottle!). I think if I'd had more time to shop, maybe at a hobby store, I might have found a smaller size at a better price. Apart from the cost, however, the paint was a great performer. The shade was almost exactly right and the material was so rich in pigment that it covered easily in one coat (though I put on two for good measure). I was amazed, also, to discover that the paint was water based, which made for easy brush cleanup.



After a careful going-over with metallic copper paint, the set looks practically ready for a concourse d'elegance. However, though the photo is flattering, this chassis would never pass for mint (see text).

Before undertaking the painting, I removed all of the tubes from the chassis – checking as I did so to make sure that each had been installed in its proper socket. I had the tube layout chart in the factory instruction manual to help me with this, but each socket is also labeled with the tube type that belongs in it. The tubes were then set aside to be tested later.

I also removed the speaker from the chassis and loosened and raised up, but did not disconnect, the output transformer. These two grime magnets were the only easily removable components on the chassis. All others were riveted in place or otherwise difficult to unfasten. The dial scale was removed

for later cleaning and to provide easier access for my paint brush. Finally, I carefully cleaned the chassis using a rag dampened with mineral spirits.

In case you decide to do over a SW-54 with a similarly distressed chassis, I can recommend the paint product I used. It is "Copper Metallic Paint ME 149-06" Manufactured by CPC, Modern Masters, Inc. of N. Hollywood, CA. Other metallic colors are available, and it might be worth laying in color that looks like the usual anodized metal chassis for future rehab jobs. As to my bottle of copper – I have enough left for 20 or 30 more SW-54s if I should ever need to do them!

I was pleased that the paint dried with a minimum of brush marks, and the color was a close enough match to the original that it did not clash with certain chassis elements (such as the front apron and various brackets) that I chose not to repaint. However, I'd

be lying to you if I told you that the chassis now looks mint!

Though the color is even and original looking, the irregularities due to corrosion are still visible. And, of course, careful as I was, I did get a bit of paint here and there on tube socket edges and other places where it doesn't belong. All these factors clearly give my "treatment" away as amateur repaint job. But I'm well pleased with the appearance and, hey, if I'm going to put in this much effort on a

radio restoration I don't want to leave the chassis with a shabby appearance!

◆ More Housekeeping

I can't stress enough that proper housekeeping of your vintage set, something that requires practically no technical know-how, can often make the difference between a set that works the first time you turn it on and one that is silent or makes only static or a loud hum.

Before ending this work session, I checked all of the tubes, paying special attention to the heater of the 35Z5 rectifier tube. The heater is tapped to power a pilot light, and if the light is missing (as mine was) or burned out, the voltage across the filament section connected across the pilot light can rise too high and burn the section out. However, all was well and the tubes received a clean bill of health.

With the tubes checked out, I went to work with my can of Radio Shack control cleaner/lubricant and sprayed the contacts on both of the bandswitch wafers. I also hit the inside of the volume control (spraying through a couple of small openings that I found). Both controls were then operated several times throughout their ranges so that the cleaner could do its job.

Before next month's work session, I plan to order a replacement set of capacitors for this radio. Once they are installed, we can fire up the equipment and see if anything comes out. See you then!

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An Antenna for Medium and High Frequencies

Two months ago we finished a series of articles on types of antennas as they vary across the radio spectrum. As a complement to that series last month we discussed an antenna for the VLF and LF bands. This month we feature an antenna employed on the MF and HF bands: the grounded quarterwave vertical, or Marconi antenna (fig. 1). This antenna was invented by Guglielmo Marconi whose pioneering wireless inventions earned him the name: "The Father of Radio."

The Marconi Antenna

The Marconi antenna is common on MF, particularly as a transmitting antenna. It is also a favorite of many DXing ham operators on the HF band. As with many antennas, the characteristic which makes this one so useful is the shape of its radiation-reception pattern. The low angles at which the Marconi concentrates its launching and receiving for a good portion of its signals makes it useful for groundwave communication on MF, and for skywave DX on HF.

Credit to Hertz, too

A passing mention should also be made of the Hertz or halfwave dipole antenna, given its high popularity and usefulness on MF and HF. This antenna was invented by Heinrich Hertz himself: the man who first convincingly demonstrated radio waves. I discussed building and using dipole antennas in the July Antenna Topics column last year. That column is available as a reprint from *Monitoring Times*.

Building a Marconi Antenna

As shown in fig. 1 the Marconi has a vertical element which is a quarter wavelength long with its lower end (base) at ground level, but insulated from the ground. At the base of the vertical element buried wires called "radials" radiate out as spokes radiate from the hub of a wheel. Generally speaking, the more of these radials we install (up to 120), the better the antenna will perform. These radials are buried one or two inches underground, or simply layed on the ground. Most ham or radio-enthusiast installations use far fewer

than 120 radials; a minimum of 15 is suggested by some antenna builders. A quarter wavelength is the suggested length for the radials, but length is not the important factor; it's more important to have as many as is practical rather than to have them a full quarter wavelength long.

On the other hand the length of the vertical element is quite important: It should be a quarter wavelength long. To determine its length use the formula given here:

$$\text{Length (feet)} = 234/\text{frequency in MHz}$$

or

$$\text{Length (meters)} = 71.3/\text{frequency in MHz}$$

If you want any antenna to be actually tuned to a specific resonant frequency, realize that formulas such as those above will only get you into the ballpark. The actual resonant length is affected by such factors as nearby metal buildings, trees, ground condition, and vertical-element diameter. Trimming the antenna's length to resonance while using a test instrument such as an automated SWR

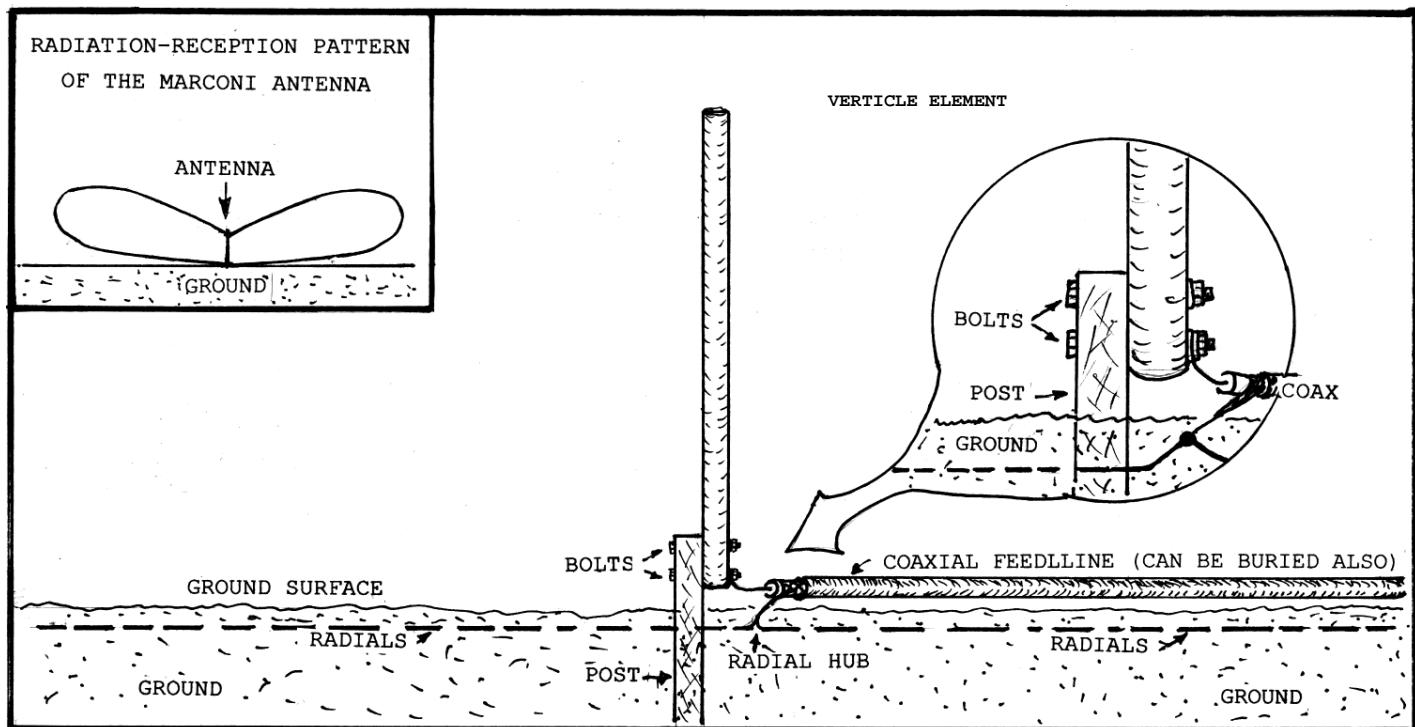


Fig. 1. A grounded quarterwave vertical antenna.

This Month's Interesting Antenna-Related

Web site:

This site has a variety of information and links concerned with antennas. Check it out at:

<http://www.beeware.com/directory/Arts/Radio/Formats/Short-wave/Equipment/Antennas/>

measurement device, noise bridge, or ordinary SWR meter is essential if you want your antenna tuned to resonance. Most hobbyist antenna builders don't bother with this precise tuning step. It is probably worthwhile on HF and MF only if you are using the antenna for transmitting, or when the antenna is used for receiving in a very electrically quiet location.

The vertical element can be made of such diverse things as metal pipe or tubing, a metal tower, or a wire supported by a tree limb or wooden pole. The greater the diameter of the vertical element the wider the bandwidth of the antenna, so a tower will have a greater bandwidth than a wire element.

Use as many radials as you have wire for. The radials are a means of reducing the resistance (and thus reducing signal-power loss) of the ground (which is part of the path for the electrical fields of the antenna). It's better to use a lot of radials that aren't a full quarter wavelength long than a few that are a quarter wavelength long. Laid on or buried under the ground, that quarter wavelength isn't resonant at the operating frequency anyhow, and isn't intended to be. Some builders just use a ground rod in place of the radials, but this should be a last resort. It is not recommended, and is a particularly poor practice if the antenna is to be used for transmitting.

Some designs utilize above-ground radials with excellent results. However, these antennas are not, strictly speaking, Marconi antennas. If the radials are quite high above ground, then the antenna becomes a groundplane antenna. For a groundplane antenna, the number of radials for good performance can be as low as two, and it does become important that they be a quarter wavelength long.

The feedpoint impedance of the Marconi varies with the installation: somewhere around 36 ohms or lower. There is no commonly-available feedline which matches that impedance, but for short runs (say 100 feet or less) using good-quality 50-ohm, or even 75-ohm feedline usually presents no significant problem for reception on HF or MF. For transmitting, an antenna matching unit (transmatch or antenna tuner) between the transmitter and feedline can allow the line to accept full power and also protect the transmitter from SWR problems. If you especially want a better match between antenna and feedline then various matching schemes such as those in *All About Vertical Antennas* by Orr and Cowan

(Radio Publications, 1986) are available.

The radials are all connected together at their hub. A good connection is important here, and soldering the wires together is a reliable way to get it. As shown in fig. 1 the center conductor of the coaxial feedline is connected to the base of the vertical element, and the outer shielding-conductor is connected to the hub of the radials.

The vertical element is mounted on a post as shown in fig. 1. The post is sufficient insulation from the ground provided the element doesn't touch the ground, and the post is dry and varnished or otherwise protected from absorbing moisture. Some installations that use guyed masts rather than a self-supporting one as shown in fig. 1, have a tubular vertical element resting over the neck end of a heavy glass bottle as an insulator.

Try to mount your antenna as much in the clear as possible so that its low-angle radiation can see its way toward the horizon without too much interference. Most of us have less than optimum antenna sites, but do the best you can. If you live in lightning country remember to use some kind of lightning protection. Disconnecting and grounding the antenna when it is not in use, and never using the antenna when lightning is likely is a minimum.

◆ Correction

In fig. 1 of the June Antenna Topics column there should be no connection between the 9-volt positive line and the antenna. Thanks to the readers who caught this.

◆ Antenna Contest:

If you have a last-minute entry for the unusual (even weird) antenna contest, get it to me right away. I hope to announce the win-

ner and discuss his or her unusual entry in *MT's* issue after next.

RADIO RIDDLES

Last Month:

I said: "There's an old saying about antennas that goes 'the higher the better.' Is that so?"

Well, as with so many things in life the answer depends on the situation. Due to an antenna's interaction with the ground the antenna's height above ground heavily influences the launch angle of its vertical radiation-reception pattern. And so, depending on where you want to aim your signals or from where you want to receive them, you can often pick an antenna height to optimize your effectiveness. If you want to communicate with stations a short distance away, particularly if there are intervening hills, lower antenna heights may be best. For DX higher may be best. And in lightning-prone areas underground (yes, underground!) antennas can be desirable to reduce chances of lightning damage, and also reduce received electrical noise.

This Month:

How can mounting your antenna lower improve communication over hills as mentioned above? And what is NVIS anyhow?

You'll find an answer for this month's riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

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What is an Internet Receiver/Tuner?

A few months ago one of my colleagues and former VP of Marketing with a number of high tech companies, Lisa H, called me and said, "Hey, have you seen the new Internet receivers? Since you write for *MT* I thought that you and your readers would be interested." I replied that I had seen some early marketing hype from two companies about a year ago. But knew nothing more. In fact, I confessed that I was not quite sure what to expect from an Internet receiver. Was it hardware? Software? How would it operate? What would it tune?

"Well," said Lisa, "wonder no more. I'm faxing you a product release from SonicBox, recently renamed iM Networks. It's real and, according to the release, available now!"

So with the promise of giving her a marketing synopsis of an "Internet receiver" and my impression of its relative importance to the world, I contacted iM Networks and asked for their latest product called iRhythm, with all the bells and whistles; quite frankly still not sure what to expect.

◆ Done ... Before They Started

After speaking to iM Networks, I tried to connect to the website of the other company who had also pre-announced an Internet receiver product months ago. I was shocked to find that they had folded their tent and closed shop without ever getting a product out the door. Clearly, the cold hard venture capital community did not consider the Internet receiver product concept important enough to finance. I reflected to myself that this was not a good sign for the Internet receiver.

◆ The Arrival

UPS delivered a small, 11 by 14-inch flat box. Not only was the size surprising, but it seemed that it had no weight. Could this be an Internet receiver? I remembered back so many years ago to when I opened my first shortwave tube (valve) receiver, my first solid state communications receiver, my first programmable desk scanner, my first synthesized

shortwave receiver ... the last big "first" had been almost two decades ago. But now I was about to discover and explore another first, my first Internet receiver!

A three-compartment hard plastic package greeted me inside the mailing box. Three dark blue pieces occupied the plastic. So what was the deal?!

◆ What Is iRhythm?

It consists of three components: iM Band Base, iM Receiver and the Remote Tuner. Hold it right there. In my opinion these component names are very confusing to radio people. The iRhythm Internet receiver product is actually a system, not simply a "re-

main piece of hardware is the remote tuner. This 9 x 4 inch (23 x 10 cm) retro styled component is where the "tuning" happens. See Figure 1. The tuning knob is visible on the left side of Figure 1. The "dial," which sits above the knob, is an LCD hash-mark "dial" which also indicates functions selected, such as audio muted. The Remote Tuner is powered by four AA batteries and allows the user to vary the audio volume and change "bands."

◆ WHOA! Internet Bands?

Yes, I was surprised and confused when I read the instructions. Here we need more definitions to be able to understand Internet radio-speak. First, the Remote Tuner is actually a 900 MHz transmitter. The corresponding 900 MHz receiver is component number two, called the Base Unit. The Base Unit connects to the USB port of your Pentium 133 (or faster) PC and the soundcard's line output. The Base Unit receives radio commands from the Remote Tuner. These commands select a website from a list of pre-programmed "stations" provided by the included iM Networks installation software.

So, in reality, the Remote Tuner is actually a fancy RF wireless remote control. All of its commands can be performed at the computer keyboard. But, I must say, that the 900 MHz works pretty good and allows you to "tune" your computer from up to 100 feet away.

The third component of the iRhythm system is a pocket-sized unit, which connects to the AUX input of your home stereo. This is yet another receiver!! As I said, iRhythm is not just a component, it's a system. This pocket-sized unit, powered by two AAA batteries, receives the audio output of the sound card. How? Good question. The Base Unit does double duty; first as a receiver of commands from the Remote Tuner, and also a transmitter of website station audio. The audio can therefore be enjoyed over your home stereo system, with all of its fidelity (almost) and convenience.

◆ Installation and Operation

The iRhythm software comes on a CD ROM ... well, not quite all the software you



Figure 1 – iRhythm's Remote Tuner Box

ceiver." Let's start with some definitions. An Internet radio "tunes" stations by connecting to websites of stations that are "broadcasting" over the Internet. The resulting streamed audio is then heard over the computer's sound card/speakers. No special "receiver" is needed. Any Pentium 100 MHz computer, with Internet access, sound card and speakers can "receive" Internet stations. Many traditional shortwave stations, such as BBC, have Internet outlets. See the *MT* feature article last month on Useful Internet Radio Sites for shortwave station websites.

"So why do we need Internet receivers/tuners?" This was the question that Lisa asked me and that I had also wondered about since reading SonicBox's first press release last year.

Well, as I said, iRhythm is a system. The

may need. The software notified me at the end of its install that I did not have all the required software on my computer. I think this is a bit backward. It should have checked my system and given me the message BEFORE it installed itself. In my case, I had Windows 95 on my laptop. However, Windows 98 Second Edition is a must. Also, I had an older version of Real Audio. Version 7 or higher is required. Therefore, the installation became a two-hour long mad dash around the house for Microsoft CDs, Windows 98 Second Edition installation and Real Audio download and installation. Not exactly what I had planned for, or the basic instructions led me to believe.

Operation, I am happy to report, was much easier than installation. All required cables are included, and a wall wart power supply for the stereo receiver pocket unit comes as an alternative to the AAA batteries. All connections are clearly marked and the hardware can be in place in a few minutes.

With your computer turned on, pushing the power button on the Remote Tuner turns on its display, brings up the iRhythm software on the computer and makes a connection to the Internet. The software can be used with either a normal telephone 56K connection or a high speed broadband hook-up. I used a 56K dial-up ISP.

◆ Computer Screen Vs Tuner Display

Figure 2 is the resulting computer screen once everything is up and running. Now, since we have our Remote Tuner we should not need to see the computer screen. Right? Well, in practice that was not quite right.



Figure 2 – Main Screen of iRhythm's Software. Note Similarities to Hardware in Figure 1

The iRhythm software displays on the computer categories of web stations listed by program type. Each category is given a letter from A to Z. Within each category is a list of actual web station names and a corresponding number starting from the number One. For example, under the category of Alternative Music there may be sixteen stations; each numbered from one to sixteen. This detailed station list is only displayed on the computer screen. See Figure 3.

◆ What is an Internet Band?

You can change categories from the Remote Tuner. However, only the category letter is displayed on the Remote Tuner's LCD.



Figure 3 – Computer Screen Showing Police "Band" and Associated Internet Stations Available for "Tuning"

The "tuning" knob is used to select the station number within the chosen category. So if your local police agency was listed as station number 11, in Category P (Police Programs), all you would see on the LCD would be P11. Great for the game of Bingo, but not really how a "tuner" display should operate.

In the above example we are tuned to the P band. If anyone at iM Networks had any real tuner or monitoring experience they would have called the bands, banks. They function exactly like channel banks on a scanner. The use of "band" and "tuner" in this application is not only misleading, it is just plain wrong, relative to their accepted usage in the monitoring world.

Only one of the "Bands," Z, is user programmable. Here the user can store new audio web sites.

◆ Whaddya Think?

iRhythm was fun to use. It incorporated some nice ideas and hardware. I suggest that you have a Pentium 233 MMX, or higher, with a USB port, 64MB of RAM, running Windows 98 (Second Edition only!), 40MB of free hard disk space, a sound card and either Real Audio Player 7 or Media Player 6.4, or newer. The iRhythm software seems to put a real strain on my Pentium 133 PC. I tried all of the stations listed under Scanners. Many of the stations listed could be accessed and a

computer voice was heard exclaiming, "This station is no longer available." With all the changes that are occurring on the Internet daily, this should come as no surprise.

At just under \$100, iRhythm is a unique product with some unique concepts. According to their website at <http://www.sonicbox.com> Philips will incorporate iRhythm technology into their home audio product line. It is rumored that iM Networks is working on a similar product which connects directly to the phone line without the use of a computer.

In summation all I can say is two things, "Lisa, I'm still waiting to see an Internet receiver." And the venture capital companies' hunches concerning the importance of this type of Internet Radio were on the mark. Unfortunately, I really cannot add this product to my list of receiver "firsts."

Next time we'll get back to mainstream monitoring topics with a look at some very useful monitoring software. That is, real radio monitoring. Till next time.

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What are synthesizers and how they work? Part 1

Today most receivers use frequency synthesizers. Many of them advertise this fact by displaying words like "PLL", "Synthesized", or "Quartz" on their front panels or in the advertising literature. Whatever one thinks of the sales language, synthesizers offer tremendous advantages to the operation of a receiver. Not only do they enable receivers to have the same stability as the quartz reference, but they also enable many other facilities to be introduced because they can easily be controlled by a microprocessor. This enables facilities such as multiple memories, keypad frequency entry, scanning and much more to be incorporated into the set.

Synthesizers are widely used, but their operation is not always well understood. One of the reasons for this is that their design can involve some complicated math. Despite this, the basic concepts are relatively easy to grasp.

◆ Basics

A frequency synthesizer is based around a phase locked loop. This circuit uses the idea of phase comparison as the basis of its operation. From the block diagram of a basic loop shown in Fig. 1 it can be seen that there are three basic circuit blocks: a phase comparator, voltage controlled oscillator (VCO), and loop filter. A reference oscillator is sometimes included in the block diagram: Although this is not strictly part of the loop itself, a reference signal is required for its operation.

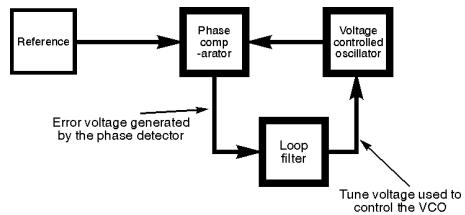


Fig. 1 Block diagram of a basic phase locked loop

The loop operates by comparing the phase of two signals. The signals from the voltage controlled oscillator and reference enter the phase comparator. Here a third signal equal to the phase difference between the two input signals is produced.

The phase difference signal is then passed through the loop filter. This performs a number of functions including the removal of any unwanted products that are present on this signal. Once this has been accomplished it is applied to

the control terminal of the voltage controlled oscillator.

This tune voltage or error voltage is such that it tries to reduce the error between the two signals entering the phase comparator. This means that the voltage controlled oscillator will be pulled towards the frequency of the reference, and when in lock there is a steady state error voltage. This is proportional to the phase error between the two signals, and it is constant. Only when the phase between two signals is changing is there a frequency difference. As the phase difference remains constant when the loop is in lock, this means that the frequency of the voltage controlled oscillator is *exactly* the same as the reference.

◆ Synthesizers

A phase locked loop needs some additional circuitry if it is to be converted into a frequency synthesizer. This is done by adding a frequency divider between the voltage controlled oscillator and the phase comparator as shown in Fig. 2.

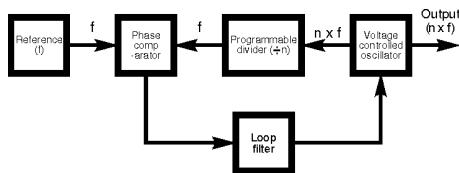


Fig. 2 A programmable divider added into a phase locked loop enables the frequency to be changed.

Programmable dividers or counters are used in many areas of electronics, including many radio frequency applications. They take in a pulse train like that shown in Fig. 3, and give out a slower train. In a divide-by-two circuit, only one pulse is given out for every two that are fed in, and so forth. Some are fixed, having only one division ratio. Others are programmable, and digital or logic information can be fed into them to set the division ratio.

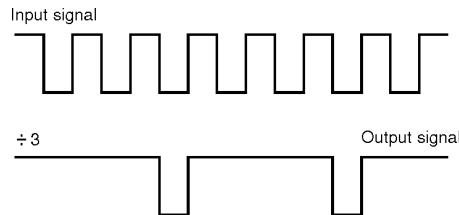


Fig. 3 Operation of a programmable divider

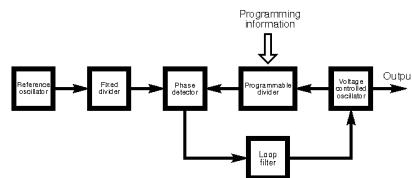


Fig. 4 Comparison frequency reduced by adding a fixed divider after the reference oscillator

When the divider is added into the circuit, the loop still tries to reduce the phase difference between the two signals entering the **phase comparator**. Again, when the circuit is in lock both signals entering the comparator are exactly the same in frequency. For this to be true, the voltage controlled oscillator must be running at a frequency equal to the phase comparison frequency times the division ratio.

It can be seen that if the division ratio is altered by one, then the voltage controlled oscillator will have to change to the next multiple of the reference frequency. This means that the step frequency of the synthesizer is equal to the frequency entering the comparator.

Most synthesizers need to be able to step in much smaller increments if they are to be of any use. This means that the comparison frequency must be reduced. This is usually accomplished by running the reference oscillator at a frequency of a megahertz or so, and then dividing this signal down to the required frequency using a fixed divider. In this way a low comparison frequency can be achieved.

◆ Analog Techniques

Placing a digital divider is not the only method of making a synthesizer using a phase locked loop. It is also possible to use a mixer in the loop as shown in Fig. 5. Using this technique places an offset into the frequency generated by the loop.

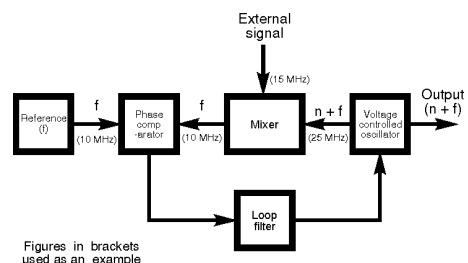


Fig. 5 A phase locked loop with mixer



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The way in which the loop operates with the mixer incorporated can be analyzed in the same manner that was used for the loop with a divider. When the loop is in lock, the signals entering the phase detector are at exactly the same frequencies. The mixer adds an offset equal to the frequency of the signal entering the other port of the mixer. To illustrate: if the reference oscillator is operating at a frequency of 10 MHz and the external signal is at 15 MHz, then the VCO must operate at either 5 MHz or 25 MHz. Normally the loop is set up so that mixer changes the frequency down, and if this is the case then the oscillator will be operating at 25 MHz.

It can be seen that there may be problems with the possibility of two mix products being able to give the correct phase comparison frequency. It happens that as a result of the phasing in the loop, only one will enable it to lock. However, to prevent the loop getting into an unwanted state the range of the VCO is limited.

For loops that need to operate over a wide range, a steering voltage is added to the main tune voltage so that the frequency of the loop is steered into the correct region for required conditions. It is relatively easy to generate a steering voltage by using digital information from a microprocessor and converting this into an analog voltage using a digital to analog converter (DAC). The fine tune voltage required to pull the loop into lock is provided by the loop in the normal way.

Multi-loop synthesizers

Many high performance synthesizers use several loops that incorporate both mixers and digital dividers. By using these techniques it is possible to produce high performance wide range signal sources with very small step sizes.

If only a single loop is used then there may be shortfalls in the level of performance.

There is a large variety of ways in which multi-loop synthesizers can be made, dependent upon the requirements of the individual system. However, as an illustration a two-loop system is shown in Fig. 6. This uses one loop to give the smaller steps and the second provides larger steps. This principle can be expanded to give wider ranges and smaller steps.

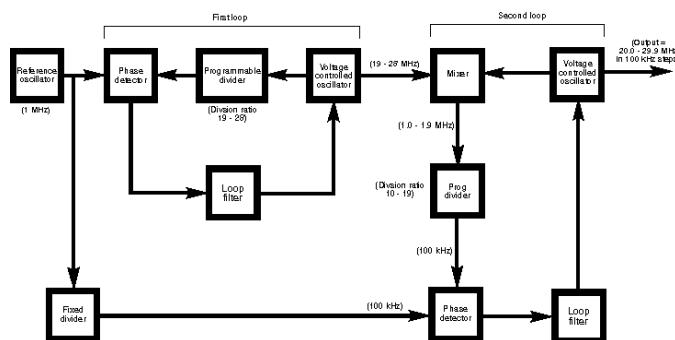


Fig. 6 An example of a synthesizer using two loops

The first loop has a digital divider and operates over the range 19 to 28 MHz. Having a reference frequency of 1 MHz, it provides steps of 1 MHz. The signal from this loop is fed into the mixer of the second one. The second loop has division ratios of 10 to 19, but as the reference frequency has been divided by 10 to 100 kHz to give smaller steps.

The operation of the whole loop can be examined by looking at extremes of the frequency range. With the first loop set to its lowest value the divider is set to 19 and the output from the loop is at 19 MHz. This feeds into the second loop. Again this is set to the minimum value and the frequency after the mixer must be at 1.0 MHz. With the input from the first loop at 19 MHz this means that the VCO must operate at 20 MHz if the loop is to remain in lock.

At the other end of the range the divider of the first loop is set to 28, giving a frequency of

28 MHz. The second loop has the divider set to 19, giving a frequency of 1.9 MHz between the mixer and divider. In turn, this means that the frequency of the VCO must operate at 29.9 MHz. As the loops can be stepped independently it means that the whole synthesizer can move in steps of 100 kHz between the two extremes of frequency. As mentioned before, this principle can be extended to give greater ranges and smaller steps, providing for the needs of modern receivers.

Next month we will take a look at phase noise in synthesizers and how it affects the performance of receivers.

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Yaesu VR-120 Portable Scanner

The Yaesu VR-120 is a palm-size wide coverage scanner. Its size, frequency coverage, and \$200 price place it in direct competition with the ICOM IC-R2 (April 1999 *MT*). Two simple AA batteries power each model. The IC-R2 is furnished with two NiCd cells and a charger, but none are supplied with the VR-120. Neither radio has a charging jack so batteries must be removed for recharging.

◆ General Features

The VR-120 is made in Japan. It tunes the spectrum from 100 kHz to almost 1300 MHz, but the US version has several undocumented frequency gaps which permit it to pass muster with the FCC's rules on rejection of cellular telephone signals (See table below). ICOM introduced its IC-R2 before the FCC crackdown and has gaps only at the cell input and output frequencies.

Users may choose AM, NFM, and WFM reception modes and 11 selectable tuning step sizes, ranging from 5 to 100 kHz. The IC-R2 provides CTCSS decoding and CTCSS search, but the VR-120 does not.

Battery life can be extended when not scanning or searching by enabling the power saver. A sleep timer function is configurable to turn the radio off after 30, 60, or 90 minutes.

Both the VR-120 and IC-R2 use a detent control knob for tuning and navigating through menus of options. The VR-120 is fitted with conventional volume and squelch knobs that are easier to adjust than the IC-R2. Pushbutton keys control the IC-R2's volume and its squelch is set using a knob and button in tandem.

A 1/8" side mounted jack is used for earphone or cloning connection. When not in use, the jack is protected from dust by a captive rubber plug.

◆ Memory and VFOs

Both the VR-120 and IC-R2 have one VFO, but different memory channel arrangements. The VR-120 sports 640 channels organized into 10 banks. The IC-R2 has 400 channels spread among eight banks.

Neither radio has a numeric keypad. The two models are programmed using a similar technique. Frequencies are entered into the VFO using a combination of the Band key and the top mounted tuning knob.

To program a memory channel, you first tune the VFO to the right frequency and use menus to select other parameters. Both radios can store the information in the next empty memory channel or you can choose a specific channel instead. Mode and tuning step size can be programmed for each memory channel. Several of the VR-120's memory channels are factory programmed to shortwave broadcast frequencies, but may be overwritten.

The VR-120 permits you to program an 8-character label for each channel, an advantage over the IC-R2.

◆ Scanning and Searching

The VR-120 can scan combinations of memory banks, in contrast to the IC-R2's single bank arrangement. You can scan all channels in the designated banks or only those channels you mark as "preferential." The upscale VR-500 uses the same arrangement. Yaesu's Preferential Scan is merely an alternative to the more familiar approach of locking out channels in other brand scanners and both schemes accomplish the same mission.

There are three choices for when to continue scanning (or searching) in the presence of a signal: Busy, Pause, and Hold. A global rescan delay waits for the signal to drop and is set to 2 seconds.

Instead of a rescan delay, you can choose to pause the scan for 1 to 12 seconds and restart the scan after that interval

even if the station is still transmitting. The Hold setting halts the scan the first time the VR-120 detects a signal.

The VR-120 provides eight limit search ranges and the IC-R2 provides 25 pairs of search limits. The VR-120 can skip up to 64 frequencies during limit and VFO searches. Special memory channels are used to store the locked out frequencies, and you can inspect or restore them.

The VR-120 includes a Smart Search (a.k.a. auto memory write), another advantage over the IC-R2. You can program upper and lower frequency limits and a starting frequency. After commencing Smart Search, the

VR-120 will look for signals in that range and store active frequencies in a special 21-channel memory bank.

Too bad that the Smart Search capabilities are so limited. The VR-120, like the VR-500, will make only one sweep through the search range before stopping. You get one chance to inspect the search results because you cannot look at them after exiting the Smart Search mode.

There are 10 pairs of Dual Watch frequencies. These behave like 10 miniature, non-linkable memory banks of 2 channels each.

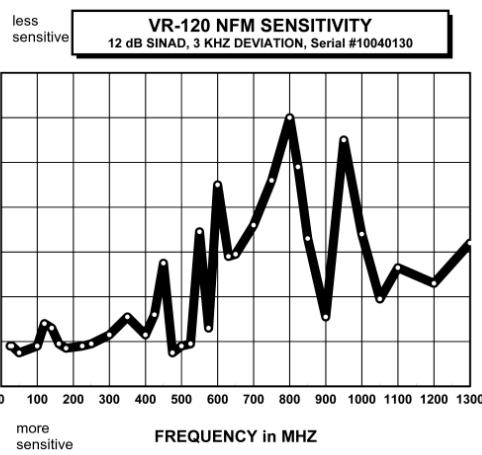
◆ Other Features

The VR-120 contains an internal bar antenna for AM broadcast band listening. A menu item lets you select this bar or an external antenna. Another menu item permits an optional earphone to serve as an antenna for stealthy VHF/UHF monitoring, an innovation also found in the Alinco DJ-X2T (December 2000 *MT*).

The VR-120's Channel Counter feature permits the radio to act as a simple frequency counter. The antenna is disabled while using the counter mode, so you must be located near the transmitter. By default, the counter is limited to a 50 MHz wide frequency range centered on the display frequency, though you can narrow it 5 MHz or widen it to 100 MHz. The results are delayed, sometimes for several seconds; we find our DJ-X2000T Flash Tune's search results are faster and more repeatable.

The memory and operating parameters of a VR-120 may be cloned from another VR-120

VR-120 Frequency Gaps	
339 - 340	542 - 549
351 - 352	558 - 572
372 - 373	605 - 615
384 - 385	620 - 630
396 - 397	784 - 798
482 - 483	807 - 820
496 - 497	824 - 849
504 - 505	869 - 894
511 - 512	



by using the optional CT-35 cable. The user manual does not document the interface protocol nor mention cloning by personal computer. Yaesu should make the interface public and let the marketplace provide a variety of computer cloning programs. The IC-R2 is more attractive in this regard because you can obtain both free and low-cost computer software for it.

◆ Performance

After using the VR-120 at home and on a dozen trips, we concluded that the VR-120 and IC-R2 are about evenly matched. Both radios perform comparably, though the IC-R2's sensitivity is more consistent. The VR-120's display is much easier to read and its classic squelch and volume knobs are better suited than the IC-R2's pushbutton arrangement.

This VR-120's audio and intermod immunity are superior to our VR-500. The IC-R2's audio is a bit crisper and the CTCSS squelch keeps more unwanted signals out.

We prefer the VR-120's BNC antenna connector to the IC-R2's SMA style. The VR-120's

rubberized antenna is a fair performer on VHF/UHF, though not as good as a wire-thin Pryme RD-9. Our VR-500's antenna has a performance notch near 159 MHz but the VR-120's antenna does not. The stock antenna excels, believe it or not, in shortwave reception. We can receive dozens of foreign shortwave broadcast stations using the stock antenna while sitting in the basement at night.

◆ Wrap-up

If you require a tiny scanner with good performance, the VR-120 and IC-R2 should be tops on your list. They are loud enough to hear comfortably and can be powered by ordinary AA

batteries. Both scan memory at about the same speed.

The IC-R2 provides CTCSS squelch and there are several free and low cost computer programs available for loading frequencies. Its duplex facility lets you monitor repeater inputs with a simple key press.

The VR-120's larger display and conventional knobs make it easier to use. It draws less battery current, which implies longer battery life. The alpha labels and multibank scanning are advantages. The internal bar antenna affords better AM BCB reception than our IC-R2.

Check the table of frequency gaps to make sure the VR-120 covers the frequencies you want to monitor.

More than just radios....

You probably know all about the great value of ADI brand transceivers, but PRYME Radio Products makes more than just radios. In fact, we manufacture a full line of aftermarket accessories for all kinds of radios, not just our own! Our line includes accessories for Kenwood, Icom, Yaesu, and many more! From Family Radios, to scanners, to amateur or commercial handheld radios, we have the right item for the job. Our accessories are reliable, innovative, and affordably priced.

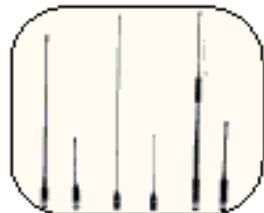
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Measurements

Yaesu VR-120 Scanner

S/N 1C040130

List price \$249

Yaesu USA, 17210 Edwards Rd., Cerritos, CA 90703

Frequency coverage (MHz):

0.1 - 1299.995 except gaps (see table)

Frequency steps (kHz):

5, 6.25, 9, 10, 12.5 15, 20, 25, 30, 50, 100

Sensitivity:

see graphs

RF attenuator:

29 dB @ 10 MHz
28 dB @ 40 MHz
15 dB @ 155 MHz
10 dB @ 460 MHz
14 dB @ 860 MHz

FM modulation acceptance:

10 kHz

Intermediate Frequencies: (MHz)

248.45, 15.0, 0.450

Image rejection due to 1st IF:

54 dB @ 40 MHz
51 dB @ 155 MHz
33 dB @ 460 MHz
58 dB @ 860 MHz

Audio output power at earphone jack:

40 mW @ 10% distortion into 8 ohms

Practical memory scan speed:

11 ch/sec.

Current consumption at 3.0 VDC:

off - 0.17 mA
manual - 27 mA avg (w/battery saver)
scan - 60 mA
full volume - 132 mA
lamps - 30 mA additional

Battery saver: after 5 sec. in Manual

Low battery warning: 2.24 VDC

Shutdown: 2.08 VDC

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Icom's Super Neat IC-706MkIIIG – Part I

To steal a page from Kenneth Graham's *The Wind in the Willows*, "Believe me, my young friend, there is *nothing* – absolutely nothing – half so much worth doing as simply messing about with radios."

Graham's original quote referred to boats, but never mind that – if you enjoy, as I do, "messing about with radios," one of the Most Cool things you can do is to get your amateur radio license. Your "ham ticket," as amateurs call it, will allow you to engage in two-way communication on the amateur radio frequencies. In addition, federal legislation specifically exempts ham radio operators from local laws that forbid ordinary citizens from carrying certain types of radio equipment, such as scanners, in their vehicles.

Furthermore, from my point of view, it is simply impossible to be over-prepared for emergency communications when the potential mulch hits the ventilation equipment. In my area (upstate New York), amateur radio operators were called out to provide emergency communications when an ice storm swept the area, and the cell phone towers were simply overloaded. When cell phones were hearing nothing but wall-to-wall busy signals, two meter ham radio was able to get through.

You can get your Technician Class license by passing a 35-question multiple-choice examination. That will give you privileges to operate on all amateur VHF and UHF frequencies (all frequencies above 50 MHz). If you pass a 5 word per minute Morse code test, you will be entitled to operate on 80, 40, and 15 meter bands using CW (Morse) and on the 10-meter band using CW, voice and digital modes.

If you pass an additional 35-question multiple-choice test, you will have earned your General Class license, with authorization to operate on any frequency in the 160, 30, 17, 12, and 10 meter bands, as well as significant segments of the 80, 40, 20, and 15

meter bands. Let me put it another way: Answer a few questions, learn a little bit of Morse code, and you can talk and operate on both local and worldwide frequencies. If that isn't a Good Deal, I don't know what is.

For those who protest that Morse code is too hard, I sympathize – I struggled for 6 years to learn Morse. But I have a suggestion: I found that the Gordon West tapes, available from Radio Shack or from W5YI (see ad in *MT*), really do the trick. Study them diligently 15 minutes every other day, and in about three weeks, you should be ready to pass the code test. At least that's the way that it worked for me.

Power output on HF and six meters is 5-100 watts (SSB/CW/FM/RTTY) and 2-40 watts AM; on two meters 2.5-50 watts (SSB/CW/FM/RTTY), 2-20 watts (AM) and 2-20 watts (AM); and on 440 MHz 2-20 watts (SSB/CW/FM/RTTY) and 2-8 watts (AM).

The 706 has more tricks than a bridge tournament, including a detachable front panel/display. With the optional remote separation cable, a friend mounted the main "box" of his 706 in the trunk of his compact car and fastened the front panel and microphone to his dash. Other goodies include tone encode, tone squelch, 102 alphanumeric memories (99 regular, 2 scan edges, 1 call), second VFO, crossband split capability, CW keyer, speech processor, and voice-operated transmit, just to name a few.

The IC-706MkIIIG comes standard with a digital signal processing (DSP) module that has an automatic notch filter (ANF) that hunts down and "kills" beat tones, tuning signals, and the like. The noise reduction capability in the DSP

helps to attenuate noise components and to boost signals that are buried in noise.

There are just 12 buttons, two pairs of concentric knobs, and the tuning knob on the face of the 706, plus a large and legible backlit liquid crystal display that serves as information central for this transceiver. Many of the buttons are backlit for easier nighttime operation.

The bottom line is that this is an attractive, compact radio that covers a considerable chunk of the frequencies that hams can operate on, as well as a number of frequencies that would be of interest to any radio hobbyist. Even better, the IC-706MkIIIG delivers all this at a street price under \$1,000. For more info, check out <http://www.icomamerica.com>.

Next time, we'll take the IC-706MkIIIG for a test drive.



The IC-706MkIIIG squeezes a lot of goodies into a compact attractive package.

After you've passed your tests, there comes the delicious and agonizing part of the amateur radio experience: buying the equipment. Most new Technician Class licensees start with a two-meter handi-talkie; then comes a 2 meter mobile rig, a 440 rig, an HF transceiver, perhaps a six-meter rig, and so forth. It's a great deal of fun in a lot of ways, but it often results in a stack of equipment and an empty wallet.

I'd like to suggest an alternative course: buy an Icom IC-706 MkIIIG. Period. This diminutive piece of gear truly is a wonder rig. Just 6.6 inches wide by 2.3 inches high by 7.9 inches deep, it weighs just 5.5 pounds. Receiver coverage is 0.000-1999.999 MHz and 400-470 MHz. Transmit coverage includes all ham bands from 1.8 MHz to 450 MHz. Available modes include USB, LSB, CW, /RTTY (FSK), AM, FM and WFM (receive only).

What's NEW

Tell them you saw it in Monitoring Times

Uniden

Developing "Project 25" Scanner

In an online exclusive with *Mobile Radio Technology*, Jim Cassidy, Uniden America's project planning manager for scanners and other products, verified that a scanner capable of receiving digital trunked Project 25 communications is under development. Project 25, a set of digital standards designed for flexibility and interoperability, is being incorporated into many new public safety communications systems as older systems are replaced. Cassidy expects the new Project 25 scanner to be on the market in a little more than a year.

Currently, there are no scanners on the market which can convert digital communications into audio signals, and some agencies have been enjoying their "privacy." However, following the release of the new scanner, Project 25 systems will again be audible to the public and the press. Project 25 does include an encrypted mode. "Once a system is encrypted, it is absolutely illegal to monitor it," Cassidy confirmed. He said that if enough systems choose to encrypt, the media's next appeal would probably be to the FCC.

Mobile Multiband Antenna

Cutting Edge Enterprises is now carrying a line of English-made antennas designed especially for the Yaesu FT-817 handheld transceiver. The Waters and Stanton antennas are ultra-light and compact. Tops in the line is the ATX-All Band antenna, which uses tapped coils with a wandering lead, but on a miniature scale. The entire coil and tap section is only 12 inches long, but works in all bands between 6 and 80 meters.

The telescoping whip section is re-



movable for the ultimate in portability.

The antennas fit into a nylon pouch, also available from Cutting Edge Enterprises and which fits onto the Worldpouch fanny pack (see April 2001 *What's New*). Antenna prices range from \$25 to \$166. Visit the website at <http://www.powerportstore.com> or Cutting Edge Enterprises, 1803 Mission Street, Suite PMB-546, Santa Cruz, CA 95060; 800-206-0115.



Wireless Weather Station

When you want to monitor the weather with a minimum of fuss, you can't beat a wireless weather station. Scientifics has just released a new model with everything you need for complete weather monitoring and forecasting. All sensors operate using 433 MHz up to 300 feet, even through walls. Additional temperature/humidity sensors and repeaters can be added to monitor up to nine locations, indoors and out.

The Professional Weather Station monitors indoor temperature, humidity and pressure; outdoor temperature and humidity; displays minimum and maximum data for all readings, with time and date. Air pressure is displayed with a 24 hour history bar chart; the weather forecast and pressure trend is shown as an icon. The rain gauge displays rainfall amount for the last hour, last 24 hours, and total amount. The wind gauge displays speed and direction.

All outdoor sensors are solar powered. The indoor receiver requires four AA batteries, and the indoor temperature/humidity sensor uses two AA batteries.

The basic Professional Wireless Weather Station sells for \$499. In addition to extra sensors or repeaters, a PC Interface is also available for \$169.95. Contact Scientifics, a

division of Edmund Scientific, Dept A011-C999, 60 Pierce Avenue, Tonawanda, NY 14150-6711; 800-728-6999, or visit <http://www.scientificsonline.com>, cons_order@edsci.com.

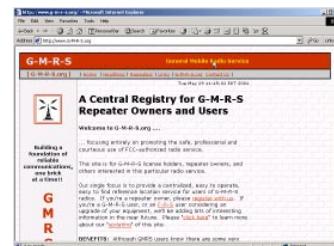
Callsign 2001

A British publisher has just released their 2001 edition of this directory of 8000 civilian and military aviation callsigns heard worldwide. The spiral-bound guide offers an alphabetical listing of callsigns,

along with aircraft type, country of origin, wing/squadron identification, home base, and other comments to aid the listener.

Cross-listing charts allow search by country and service. A great look-up guide for avid aviation enthusiasts. US\$19 with airmail postage included, payable by International Money Order or similar transfer in UK Sterling funds.

Order from Photavia Press, Sunrise Break, Chiseldon Farm, Southdown Hill, Brixham, Devon TQ5 0AE, UK. Visit their web site at <http://www.photav.demon.co.uk>



GMRS Directory

Wayne Barringer and Bob Leef of California have established a website for the development of an online directory of General Mobile Radio Service repeaters throughout the U.S. <http://www.G-M-R-S.org> was established as a service to new GMRS owners looking for a repeater in their area and owner/operators looking for potential club members and/or paying subscribers. Repeater owners and

operators are urged to visit the site to list their repeaters for the benefit of all. The form is a simple one, and optional fields such as tone, etc. may be omitted if the owner is concerned about unauthorized use.

Scanner Sales and Service

G&G Communications, one of the few locations that still performs scanner repairs, is now available on the web at <http://www.iinc.com/ggcomm/> Check out their sales, parts, pagers, and list of all known scanners while you're there!

Kachina Discontinues HF Radio Products

At the end of May, Kachina Communications, Inc. discontinued production of all HF radio products, including the 505DSP (reviewed Oct '99) and its related accessories, citing the reduced worldwide demand for amateur radio in general and HF radio in particular. Check <http://kachina-az.com> to see if any bargain-priced inventory remains. The company promised to service all Kachina HF radio products for the foreseeable future, and to honor all factory warranties through the duration of the warranty period.

Kachina Communications, Inc. will remain in Arizona, as a provider of broadband wireless Internet products and services.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to meditor@grove-ent.com.

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"No doubt about it, the future is here! Sure nice to get the magazine so early, this has got to be the way! Thanks for a great job!"

- Charles (Chuck) Boehnke
Keaau, Hawaii

"You and the MT staff that put this project together have done a FANTASTIC job. You would seem to be the leaders in the field presenting material in this manner so it can be archived so easily. This is the way to receive a magazine."

- Don Nauer

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The BBC Should Reconsider

Guest Editorial by John Figliozi

The BBC's announcement in early May that it intends to end the use of shortwave to North America, Australia and New Zealand as of July 1 came as a shock to the system for many of us. As this is being written, there has been substantial criticism of this decision and there are serious efforts underway to convince the World Service that these plans should be reversed or at least delayed. Nonetheless, whatever the BBC ultimately decides to do, just the announced intention alone warns us that we need to more closely consider the implications that the interplay of shortwave listening, international broadcasting and the new media have for us as we proceed into the 21st century.

At the outset, let's be honest. This is not as outlandish an idea as some among us would like to believe. The emergence of other delivery systems for international broadcasting over the past decade and the need to be both efficient and effective have compelled broadcasters to weigh one against the other and all against traditional shortwave. With too few resources chasing too many tasks, the pressure to find the right mix is tremendous. However, the measurement tools available to help make these determinations are imperfect at best and can lead broadcasters to make faulty judgments in the hot pursuit of valid objectives. All of these factors are at work in the instant case.

The research that the BBC has released to support its decision is less than persuasive, especially when viewed in the light of other relevant facts. For example, Lexitronics (which markets Grundig radios in North America) says that sales of shortwave radios approach one million units annually. The overwhelming majority of those receivers are portables, which are suitable for program listening but ill-equipped for DXing. Add that figure to the number of shortwave sets already in use and you get quite a substantial figure. Yet, extrapolations drawn from BBC figures show that the World Service shortwave audience in North America is less than 700,000. If the objective for the BBC is to make the right call on delivery mix, then this is one discrepancy that has to be addressed. There are others.

The BBC does not differentiate the extent to which its broadcasts are available to listeners via each delivery system. Occasional BBC newscasts or even overnight carriage on FM public radio stations does not equate to the full service that is available via shortwave. Neither does the World Service acknowledge that the characteristics and level of

commitment of its audience likely changes depending on the delivery system. The Internet can provide the service around the clock, but it cannot yet provide it with the affordability and portability that shortwave does. Does dropping shortwave mean that the BBC has decided that North Americans are interested only in its news and not in the "rich mix" of programming which is the hallmark of the World Service? Does it mean that the BBC is willing to forego – even temporarily – an ability to reach whole segments of its listener base?

The BBC also appears to have misjudged the quality and commitment of its shortwave audience in North America. For this, though, it is the listeners who must accept some responsibility. In the face of inadequate research tools, the direct response of listeners carries considerable importance. The legendary passivity of shortwave listeners, except for the pure hobbyists in singular pursuit of QSL cards, have left broadcasters with a distorted picture. They see shortwave listeners largely as hobbyists interested only in trinkets, rather than listeners interested in or committed to their programs. If you've concluded that shortwave listeners have no interest in your product, it makes little sense to spend literally millions on transmitter time when it seems that the money could be put to better use elsewhere.

This distortion is real and the BBC's announcement clarifies it all too well. It should serve as a wake-up alarm to shortwave listeners, the clubs, ANARC and others that presumably wish to see shortwave retain viability as a communications medium on this continent. But, that's a subject for another editorial.

Having said that, though, if the BBC really wants to get it right, it needs to look beneath the surface and beyond raw numbers. The added value of having the World Service available via FM, the Internet and eventually direct satellite are positive developments. However, at the present time, none of these yet provide the extent, the ease and affordability of access, or the portability that shortwave radio provides for many listeners.

The equation that the BBC apparently feels it has achieved in North America is a myth. There may indeed come a day when some technology or mix of technologies will provide what shortwave currently provides and provide it better. But that day did not come on July 1. For its good and the good of its loyal listeners, the BBC should reconsider.

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